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Editors' Introduction*

Casualty actuaries are becoming increasingly involved in regulatory and public policy issues, such as risk-based capital requirements, insurance classification systems, and composite rating states. Similarly, state regulators must understand the actuarial underpinnings of financial reporting, solvency monitoring, and rate setting techniques.

As the insurance marketplace becomes ever more complex, regulators and actuaries must rely on the others' skills and expertise. Indeed, recent insurance developments demonstrate the gains from joint regulatory-actuarial efforts. For instance, many components of the risk-based capital formula for property-casualty insurance companies stemmed from the collaborative efforts of an NAIC working group and an American Academy of Actuaries task force.

The rewards of such collaborative efforts are great, but achieving them is not easy. David G. Hartman, who has written the introduction to this volume, and who served as Chairman of the American Academy of Actuaries task force on risk-based capital (as well as President of the American Academy itself), met time and again with Mr. Vincent Lauretta, Chairman of the NAIC working group on risk-based capital, to ensure that the actuaries' efforts were in line with the objectives of the regulators.

Collaborative success has a further prerequisite. Actuaries must understand the goals of regulators, even as regulators must understand the techniques used by actuaries. Since its inception in 1983, the *Journal of Insurance Regulation* has served as a bridge between these two groups of professionals, presenting actuarial concepts in clear English to regulators and synthesizing regulatory concerns into the rigorous patterns demanded by actuaries.

This anthology reprints 20 important papers from the *Journal of Insurance Regulation*. These papers were chosen for their relevance to current public policy issues. For instance, the paper by Stephen

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*The editors wish to thank Impressions Book and Journal Services, Inc. and Shari Bladell for their excellent editorial assistance.*
Lowe and Stephen Philbrick on "Issues Associated with the Discounting of Property/Casualty Loss Reserves," was written 12 years ago, when undiscounted loss reserves were used by all the property-casualty insurance accounting systems. Since that time, the IRS has switched to discounted loss reserves, the NAIC now uses a discount factor for the reserving risk charge in the risk-based capital formula, and both the AICPA and the American Academy of Actuaries have been examining the proper valuation of insurance loss reserves for GAAP financial statements. The Lowe and Philbrick paper, which contains not only a thorough presentation of the arguments for and against discounting, but also a clear exposition of the accounting effects of loss reserve discounting and the amortization of the reserve discount, is essential for understanding the current debates on this issue.

The same is true for the other papers in this volume. If actuaries wish to influence the insurance marketplace, they must understand the regulatory and public policy issues associated with each subject. For instance, computing the gain in "efficiency" resulting from refining a risk classification plan is a purely actuarial task. But the public policy constraints on risk classification plans are complex. Unless the actuary understands these constraints, any "gains" from classification efficiency may turn out to be mirages.

Not all actuaries have ready access to the Journal of Insurance Regulation, and fewer still are aware of the wealth of material to be found in its issues. This volume contains 20 of the papers from past issues of the Journal that are most relevant for today's practicing actuary or insurance regulator. In addition, many of these papers are included in the CAS examination syllabus, on statutory accounting, loss reserving, state regulation, and solvency monitoring. The reprinting of these papers in a single volume should assist actuarial candidates in effectively preparing for the examinations.

Many of the articles are preceded by editors' introductions composed specifically for this anthology. These introductions highlight the elements of these papers that are most relevant for current public policy issues, and they summarize the changes in business practices, insurance regulation, and actuarial practice since the papers were first published.

Most of the papers here are reprinted as they originally appeared, with minor editorial corrections for typographical errors and ma-
spelling. An exception is the paper on "Completing and Using Schedule P." The original Journal of Insurance Regulation paper related to the 1992 Schedule P. Because of the numerous changes in Schedule P in the past four years—such as premium development, loss sensitive contracts, claim count histories, tabular discounts, anticipated salvage and subrogation, and claims-made policies—half of the 1996 Schedule P is new. The original paper has accordingly been entirely rewritten for this anthology.

—Sholom Friedhman and Gregory Krohm
October 1996

1. The format and citation styles of the Journal have varied over the period when these papers were first published, particularly with regard to references and citations. These stylistic differences remain in this anthology. Moreover, the biographical sketches of the authors pertain to the time of original publication. In some cases, the authors no longer are associated with the same organizations. Finally, the editor's notes to the articles refer to comments made at the time of original publication.
Preface

David G. Hartman

Property-casualty insurance operations are becoming increasingly complex, requiring ever more astute and well-trained personnel to perform them. Gone are the days when a simple premium-to-surplus ratio defined capital requirements, or an unadorned combined ratio sufficed to indicate pricing adequacy. Maybe not gone, but also disappearing is the "back room" actuary, who calculates numbers on a spreadsheet but never ventures into the public arena.

This complexity has led to an intertwining of the roles of actuaries and regulators. State regulators must determine whether a rate increase is justified, whether a company's reserves are adequate, or whether an insurer is undercapitalized. Few regulators have the expertise to answer these questions independently. Rather, regulators are working with casualty actuaries to set appropriate standards and measuring tools to resolve questions that arise.

When Proposition 103 roiled the California waters, casualty actuaries testified at rate hearings and before judicial bodies on rates of repair and driver classification schemes. As the NAIC developed its risk-based capital requirements during 1991–94, casualty actuaries worked closely with regulators to quantify the risks and determine appropriate capital standards.

There are good and growing reasons for actuaries and regulators to interact, and in the past few years I have been fortunate to have worked at the intersection of the actuarial profession and public, as represented by regulators. Three outcomes illustrate this interaction, and each shows the benefits of cooperation between actuaries and regulators.

1. Estimating property-casualty loss reserve needs, as well as monitoring loss reserve adequacy, is a complex task. To min-

*Senior Vice President and Chief Actuary, Chubb Group of Insurance Companies. Past president, American Academy of Actuaries, and past-president, Casualty Actuarial Society.
imize insurer insolvency, with their consequent harm to policyholders, state regulators must evaluate whether reported reserves have been properly quantified. Yet the expertise and quantifying these reserves lies with company actuaries, whose interests are not always the same as those of regulators.

In the early 1980’s three distinct committees contributed to what resulted in the Statement of Actuarial Opinion Regarding Loss and Loss Adjustment Expense Reserves, that must now accompany an insurer’s annual statement. The NAIC Blanks (EX4) Task Force, composed of state regulators, decided on the final wording of the Opinion and of related regulations. In addition, the NAIC Casualty Actuarial (Technical) Task Force (CATF), composed of actuaries working in state insurance departments, developed drafts of the Opinion and of the regulations (and still proposes revisions each year).

Thirdly, the Actuarial Advisory Committee to this Task Force had developed the original drafts and recommendations that the CATF perfected into drafts for the Blanks Task Force.

2. Capital standards development is an equally critical task for the prudential of the public. After all, even if reserves are correctly stated, other unforeseen events may undermine the financial solvency of the insurance enterprise. The current minimum capital statutes of most states are often ad hoc requirements, and they give state regulators insufficient authority to deal with impaired companies.

The NAIC Risk-Based Capital Working Group issued the first draft of new capital requirements early in 1991. This first draft, the early risk-based capital formula, was a rough version, with some pieces entirely missing and other pieces only partially complete.

Several actuaries formed an Advisory Committee to assist the NAIC in refining the risk-based capital requirements. Subsequently it became a task force of the American Academy of Actuaries. Our role was not adversarial: we were not presenting an industry counterpart to the NAIC position. Nor were we serving as simple consultants, performing statistical work for which the NAIC lacked the resources. Rather, our role was professional: we brought actuarial ex-
pertise to the quantification of risk and the determination of capital standards. Sometimes our conclusions were suppor-
tive of the NAIC procedures, sometimes they were critical of them.

But they were well-reasoned and objective actuarial con-
clusions, distorted as little as possible by the special interests of particular groups. Both the NAIC and the insurance indus-
try valued our judgements, leading to an enormously produc-
tive relationship. Whole sections of the risk-based capital for-
mula were added by our committee, and the calibration of parameters of many other sections were changed.

3. It has not always been easy to work together because, unfor-
tunately, a bad past experience may have prejudiced the re-
relationship. Some may say, "If the NAIC wants it, then it can't be good." "The insurance regulators may say, "If the industry wants it, there must be a catch." However, public policy is-
issues—such as workers' compensation state statutes and per-
sonal automobile rate levels and risk classification—are is-
issues where actuaries and state regulators often have worked
well together.

The American Academy of Actuaries serves as the spokes-
group of the actuarial profession, and we increasingly encourage working with regulators and other public officials, not at cross purposes to them. Actuaries are not effective when they simply criticize regu-
lators; they add little value when they uncritically support them;
but they have great influence when they work independently, yet
with them.

The Journal of Insurance Regulation has long served as a support
and bridge between actuaries and regulators. The Journal publishes
accurate and refereed papers, containing cogent arguments and so-
phisticated analysis, yet in clear language that is understandable to
a non-technical audience.

It is most beneficial, therefore, that the Journal is publishing an
anthology of its most influential articles on topics that have ap-
peared during the past ten years. The chapters in this anthology span
a wide range of topics important both to the actuarial profession and
to state regulators: ratemaking, auto insurance pricing, residual mar-
kets, reserving and solvency monitoring. Not only are these signifi-
cant papers, but also each relates to problems that are now in the
regulatory limelight, and each shows how current actuarial thinking can help devise solutions.

I encourage you to read each of the papers in the volume. But don’t stop there. Read introductions to each chapter as well. These relate the papers to recent actuarial and regulatory thinking on the topic. We will be better actuaries and better regulators for it. Even more important, together we will be better able to serve the public.
Actuarial Principles and the Politics of Ratemaking

Introduction


A company setting: The pricing actuary prepares an auto rate filing, meticulously setting forth historical losses, development factors, trend factors, and expense levels to determine adequate premium rates for the future policy period. But the filing is returned—rejected—for what can only be political reasons. The insurance commissioner is an elected office, and automobile rate increases, no matter how necessary, never fare well with the public.

A department setting: The insurance commissioner contemplates a workers' compensation rate filing. The trend factors are overstated, the expense levels would be sufficient for even the worst-managed company, and investment income is ignored. There will be public hearings, expert testimony, and an abundance of acrimonious debate. Eventually a compromise will be decreed, a Solomonic slicing of the child. The industry will then castigate the state for suppressing rates, and employers will cry that the commissioner has been hoodwinked by insurers.
These are not fanciful scenarios. These are the scenes replayed week after week across the U.S. They involve not disputes about isolated figures or statistical procedures, such as the proper method of determining a loss development tail factor. Rather, they reflect differing perspectives on what seems like a continuing battle between insurers and their regulators, in which each side claims the banner of truth.

Are insurer rate filings generally justified, providing for adequate but not redundant rates? And do many states habitually suppress premium rates, forcing losses upon insurers and driving capital out of the industry? Or are rate filings often excessive, providing for unwarranted profits? And is state regulation needed to ensure fair rates in insurance policies that are too complex even for sophisticated consumers?

Orin Kramer's masterful paper, "Rate Suppression, Rate-of-Return Regulation, and Solvency," presents the former view. But rate "suppression" is as elusive as it is widespread. One knows it, perhaps, when one sees it, but (in the past) only anecdotal description of its prevalence—or absence—could be provided.

Kramer provides a definition of rate suppression, quantifies its reach, and measures its effect on the insurance industry. Robert Klein and Robert Hunter provide regulatory and consumer responses, and they critique some of Kramer's methods and his conclusions. The debate about rate suppression will continue, but now the participants can proceed from a common base.

The controversy between Kramer, Klein, and Hunter begins with the very method of identifying rate suppression jurisdictions. The practicing actuary, of course, finds no need for a complex definition. If the rate indication calls for a 15 percent premium level increase, and the state insurance department does not grant the rate request—despite having no valid actuarial justification for the rejection—the actuary finds rate suppression. But this only begs the question. The state regulatory official may have perceived the rate indication itself as unwarranted, and the rejection as fully supported by the evidence.

In the search for objectivity, Kramer provides a three-fold manner of identifying rate suppression. Rate suppression may be identified, separately by state and by line of business, by three means:

- Several years of operating losses by the insurance industry,
- A high residual market share, and
A history of insurance department rejections of bureau rate filings.

Noces of these characteristics is perfect. The first two are symptoms of rate suppression, not instances of rate suppression itself, and they are subject to differing interpretations. Clearly, if voluntary market rates are kept inadequate, then insurers will lose money and residual markets will grow. But insurers can lose money for other reasons as well, such as natural catastrophes. Similarly, residual markets are difficult to depopulate, particularly in workers' compensation, because servicing carriers have little incentive to help control the loss costs of insureds of the involuntary pool.

The last item in Kramer's list, the "history of insurance department rejections of bureau rate filings," only begs the question again. Perhaps the bureau rate filings are excessive, and they are rejected for valid substantive reasons, not because of political pressures. Or perhaps they are rejected because the statistical support is insufficient, even if the rate revision is justified.

Robert Hunter criticizes Kramer's categorization of the states, pointing out that several of Kramer's "rate suppression states" actually showed above average profits. Robert Klein's critique centers on alleged methodological errors in Kramer's analysis, since operating losses are used both to identify rate suppression jurisdictions and to quantify the cost to the industry.

These are not oversights on Kramer's part. In fact, Kramer warns against an over-emphasis on individual state results. He might respond to Hunter's criticism by comparing his analysis to actuarial science: the underlying patterns, which are obscured by the details of individual policies and losses, are revealed by inter-state and multi-year averages. And he might accede to Robert Klein that his cost estimates are not perfect. But they are good starting points, better than the guesses that are otherwise bandied about.

Many casualty actuaries see the world solely through Kramer's lenses. But as Robert Klein admonishes, there is an equally valid regulatory perspective. Actuaries will be ineffective in rate hearings unless they can view the world from the regulator's side as well. And they will be equally helpless at public hearings unless they understand the consumer perspective, as outlined in Robert Hunter's critique. From the three views presented here, the naïve reader might select one and dismiss the other two, the more astute reader will
Competition and Regulation

Quantifying the effects of rate suppression is but the prelude to Kramer's analysis. If political pressures lead to rate suppression in state after state—which fuels the growth of residual markets, drives capital out of the industry, and erodes the financial stability of insurance companies—then why are we regulating rates in this fashion? Kramer's paper eloquently develops two themes:

- In a competitive industry like insurance, the open market is a more efficient regulator of prices than government officials. Indeed, prior approval rate regulation often does more harm than good for the public.

- Of all the types of rate regulation used by state insurance departments, "rate of return" measures patterned after rate regulation of public utilities are among the least beneficial and most inefficient types of regulation.

Kramer's views regarding competitive markets are shared by most economists, including Robert Klein, whose papers on this issue are cited by Kramer. In fact, although Klein sometimes chides Kramer for overreaching, he never disputes the fundamental conclusions of Kramer's analysis. Readers of this volume will discern a common theme running through this paper and many others included here: rate regulation is rarely in the public interest.

But scholarly analyses do not satisfy the public thirst for lower premiums, so rate regulation—along with rate rollbacks, and constraints on underwriting—recurs time and again in many jurisdictions. The passage of California's Proposition 103 in 1988, with its lure of a 20 percent rate rollback, illustrates the intense public dissatisfaction with premium levels in some states.

Kramer's second theme is particularly insightful here. Proposition 103 uses a return on surplus measure to set fair premium rates. The NAIC's 1984 study of rate regulation endorses rate of return measures, as opposed to traditional underwriting profit margins, when states explicitly regulate rates. [The NAIC study takes no po-
The actuarial literature, and especially the CAS examination syllabus, is replete with papers on "total rate of return" pricing models, whether risk-adjusted cash flow models or internal rate of return models. The evolution from simple underwriting profit margins to sophisticated financial pricing models is proceeding rapidly.

Not so fast, cries Kramer. Traditional rate regulation may worsen the availability of insurance coverage, but at least it has little effect on the efficiency with which insurance is supplied. Rate of return measures, however, are particularly insidious. They curtail the incentives for innovation, they lead to inefficiencies in production, and they tie up regulatory resources in wasteful review of complex rate filings. As Kramer and Klein agree, there are important types of regulation that states often lack the funds to provide, such as the provision of consumer information and the monitoring of insurer solvency. Why waste scarce resources, then, on costly, perhaps useless, and potentially harmful rate regulation?

These are the questions that Kramer, Klein, and Hunter pose to regulators, actuaries, and other readers. Ultimately we must ask ourselves: "In the rush to more sophisticated rate regulation, are we doing more harm or good to the public?" The answer may not yet be clear, but we no longer have an excuse to avoid the question.
Rate Suppression,
Rate-of-Return Regulation, and Solvency†

Orin S. Kramer*  

Abstract  
This article examines the effects of efforts to make available to consumers insurance coverage at affordable costs. In particular it concentrates on efforts at rate suppression and rate-of-return regulation in the private passenger auto and workers’ compensation lines of insurance. The author measures the quantitative effects of rate suppression on insurer finances and concludes that rate suppression increases insolvency risks, produces price inequities among insureds, increases the residual market, increases premiums in the voluntary market, and restricts the availability of insurance coverage.

Introduction  
Historically, the standard governing property and casualty insurance rate regulation has been that rates should not be inadequate, excessive, or unfairly discriminatory. The prohibition against excessive rates meant that rates should be in line with expected insurer costs. It did not imply making rates “affordable.” Indeed, affordability per se was not an explicit goal of regulatory policy. During the 1980s, a

† The article that appears here was adapted by the author especially for the Journal from Chapters 3 and 5 of his larger work, Rate Suppression & Its Consequences (J.I. Press, 1991). Permission of the publisher to print this adapted version is gratefully acknowledged.  
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sharp rise in claim costs in certain lines of coverage; namely, the lines involving medical and personal injury litigation, produced a significant escalation of insurance rates. As rates for private passenger auto and workers compensation coverage rose to levels that exceeded societal tolerance, affordability has emerged in some jurisdictions as a primary rate regulatory goal.

In theory, affordability represents a benign, progressive regulatory standard. In practice, a regulatory regime that seeks to peg prices to the buyer’s ability to pay inherently politicizes the rate regulatory process, risks rate inadequacy, and threatens serious availability problems for consumers. The affordability standard forces regulators into the thicket of determining what one can afford to pay how much, and which insureds should subsidize those deemed unable to pay rates that reflect their expected loss costs. That process disconnects ratemaking from the historic equity principles that underlie insurance pricing. It transforms the insurance regulator into an arbiter of income redistribution policy.

When the regulatory action that holds rates below the level implied by expected loss costs becomes particularly intensive, we call that phenomenon “rate suppression.” As used here, rate suppression does not mean bad faith on the part of any regulatory body. Rather, rate suppression is defined by the result: substantially inadequate rates imposed by regulatory authority.

This study investigates the evolution, myriad forms, and consequences of rate suppression for insurance markets and the financial condition of the insurance industry. The academic literature includes analyses on the effects of different forms of rate regulation, which are cited in this study. But we are unaware of any comprehensive effort to examine rate suppression per se and quantify its dollar effects for insurers.

This study focuses exclusively on private passenger auto coverage and workers compensation—the two major lines most affected by rate suppression regimes. Those two coverages represent the heart of the property and casualty insurance business; together, they produced 50 per cent of the property and casualty insurance industry’s premium volume in 1990. The decline in the industry’s operating profitability over the past 15 years—a decline masked partially by unprecedented capital gains—was a function primarily of exceedingly weak returns in these two major lines. The poor performances in these lines were not entirely a function of rate suppression. But losses were by far the greatest in rate suppression states, and it was
the deep losses suffered in those states that made the overall picture so bleak.

The central fallacy that underlies rate suppression is the implicit belief that it offers an economic "free lunch." That if insurers are coerced into providing lower rates than would exist in a competitive pricing environment, other societal goals—insurance availability, service levels, accident prevention, pricing equity, and insurer solvency—will not suffer. This study documents that rate suppression buys short-term price relief to the detriment of those other policy objectives.

Severe rate suppression ultimately will prove incompatible with the existence of private insurance markets. When regulatory policy implicitly demands that insurers write coverage at a loss, it is attempting to socialize the cost of public priorities, e.g., low-cost auto coverage for low-income urban residents—through a private market mechanism. To the extent that insurers are compelled to address social policy goals on an uneconomic basis, new capital flows will dry up, and existing capital in the business will be depleted.

Over the past year, the salience of the insurer solvency issue has risen on the public policy agenda. The striking common denomi-nator among the various solvency reform efforts—within the National Association of Insurance Commissioners ("NAIC") and within the Congress—is that none address the issue of regulatory intervention that precludes price adequacy. It is unnecessary to argue that rate inadequacy has been or will become the primary cause of property and casualty insurer insolvencies. Permitting adequate rates is a critical, albeit not sufficient, element for effective solvency regulation; companies may fall for an abundance of reasons unrelated to rate suppression, but the financial losses that accrue from inadequate rates will hasten their demise. Although curtailing rate suppression will not eliminate insurer insolvencies, no solvency program will be fully effective so long as it implicitly sanctions regulatory denial of adequate rates.

**Insurer Financial Performance and Solvency Effects**

No single criterion suffices to identify a rate suppression state. Poor financial performance, large residual markets, and a history of dis-
approval of rate requests are all symptomatic of price inadequacy. Each, however, can occur in the absence of rate suppression. For purposes of the quantitative analysis that follows, this study characterizes states as rate suppression jurisdictions if they met two out of three criteria:

1) A residual market in 1989 that represented at least 10 per cent of the total market for private passenger auto or 20 per cent of the total market for workers compensation,

2) Average negative operating income over the 1987-89 period for private passenger auto or workers compensation, and

3) A history of disapprovals of rate requests by the major rating bureaus over the 1987-89 period. Those tests were applied separately for private passenger auto and workers compensation on a state-by-state basis.

In general, the methodology errs on the side of understating, rather than overstating, the number of rate suppression jurisdictions and the dollar cost of rate suppression. The methodology does not penalize states for delays in acting on rate increases, which can serve as a form of rate suppression. States where rate filing data were unavailable were treated as if there had been no regulatory disapproval of filed rates. States without formal residual market mechanisms (i.e., some jurisdictions with competitive state funds or monopolistic state funds for workers compensation) were treated as having no residual market. Finally, there were states where operating income, although poor, was not actually negative, to the extent those states were classified as non-rate suppression jurisdictions, the incidence and cost of rate suppression may have been understated.

Several caveats are necessary. Though the formula will distinguish properly between rate suppression and non-rate suppression states in most instances, no arithmetic formula will yield indisputably the proper designation in every instance. Similarly, it is possible to generate estimates of reductions in insurer earnings (or profits foregone) by virtue of rate suppression which, on average, will be reasonably accurate. But it is not possible to quantify those losses on a state-by-state basis with great precision. The reason is that it is impossible to calculate with certainty what profits would have been at a given time in the absence of rate suppression. Finally, because the study covers the 1987-89 period, there are states characterized
as rate suppression jurisdictions which might be categorized otherwise today, likewise, there are states where rates were adequate over that period but where suppression exists today. Thus, despite its post-1989 history, the California auto insurance market is treated here as not being subject to rate suppression. The limitations described above do not impair the credibility of the overall estimates regarding the nationwide costs of rate suppression, but data regarding individual states should be treated cautiously.

Tables 1 and 2 summarize the data examined to identify rate suppression states. For each line of business, the 50 states (plus the District of Columbia and Puerto Rico) were ranked in accordance with average operating profit over the 1987–89 period. The operating profit figures were obtained from the NAIC By-Line By-State Profitability Report. States which met the residual market criterion were noted in the next column. The final column identifies jurisdictions with a history of disapproval of filed rate requests from the raters organizations described above. The reader will note that there are a number of non-rate suppression jurisdictions where there are large residual markets or where operating returns fall well below the most conservative estimates of insurer cost of capital. In 1989, $31.9 billion in premium—approximately 15 per cent of the industry's total volume—was generated under conditions of rate suppression. Over the 1987–89 period, a conservative calculation indicates an earnings shortfall of $9.64 billion (including $7.3 billion in workers compensation) caused by rate suppression. That translates into an average annual loss of $3.21 billion in insurer earnings. For 1989, that earnings shortfall was equivalent to 27 per cent of the industry's total pre-tax operating income. The insurer losses produced by some residual market facilities—for example, the $3 billion accumulated deficit of New Jersey's now defunct JUA—are not included in the calculation of rate suppression costs (see Table 3).

The dollar amounts refer only to business written under rate suppression conditions. For example, the study found that New Jersey suppresses rates for private passenger automobile coverage. Thus the study would include all private passenger auto business written in New Jersey as rate suppression business, it would not include all

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1. For an understanding of the quantitative findings, their ramifications, and the state-by-state analysis, see Kramer, RATE SUPPRESSION AND ITS CONSEQUENCES (1991). Highlights from those findings are summarized in the text.
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Source: NAIC, By-Line By-State Profitability Report, Connegi B. Co.; Insurance Services Office, Inc.; Kramer Associates Analysis
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Sources: NAIC, By-Line By-State Profitability Report, CONNING & CO., NATIONAL COUNCIL OF COMPENSATION INSURANCE Telephone Survey, KRAMER ASSOCIATES ANALYSIS
### TABLE 3
Direct Premium Written in Rate Suppression States (Millions of Dollars) 1989

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<tr>
<th>State</th>
<th>Auto Premium</th>
<th>Workers Compensation</th>
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<td>Alabama</td>
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<td>Arizona</td>
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**TOTALS**

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**Source:** A.M. Best Annual Statement Data, Kramer Associates Analysis

Property and casualty business written in New Jersey as rate suppression business.

For the three years analyzed, in private passenger auto coverage, on an operating basis (i.e., after investment income but before taxes) insurers lost 3.8 cents-per-dollar of premium earned in rate suppression states, compared to a gain of 1.7 cents-per-dollar of premium earned in non-rate suppression states. For workers compensation, the chasm was dramatically wider: A loss of 12.6 cents-per-premium dollar in rate suppression states compared to a gain of 4.3 cents-per-premium dollar in the other states. In private passenger auto, 78 percent of the premium volume in rate suppression jurisdictions came from four states: Texas, Pennsylvania, Massachusetts, and New Jersey. The picture in workers compensation was less concentrated, with the four largest rate suppression states—Texas, Pennsylvania,
Florida and Massachusetts—constituting 53 per cent of the total [see Tables 4 and 5].

If the rate suppression lines are treated as stand-alone businesses, within reasonably short time-frames these significant operating losses will eat through net worth. An insurer writing nothing but workers compensation in the average rate suppression state would exhaust its surplus in less than five years. To be sure, other factors beyond operating income will intervene to increase or decrease surplus, and few insurers write nothing but rate suppression business. But treating activity in rate suppression states as a stand-alone business is a useful way to begin to appreciate the insidious relationship between sustained operating losses and net worth.

Nearly two-thirds of the industry wrote 10 per cent or more of its total business under rate suppression conditions, one-quarter of the industry wrote 20 per cent or more of its total business under such conditions. Companies that wrote significant amounts of business in rate suppression jurisdictions had lower overall profits (and thus incurred greater insolvency risk) than did companies with a lesser presence in rate suppression states. In other words, companies

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<td>(Dollar Values in Millions)</td>
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<th>Earned Premium</th>
<th>Operating Profit</th>
<th>As Percent of Earned Premium</th>
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<td>0.7%</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>GEORGIA</td>
<td>3,000</td>
<td>-23</td>
<td>-0.9%</td>
<td>89</td>
<td>74</td>
</tr>
<tr>
<td>MICHIGAN</td>
<td>7,251</td>
<td>-178</td>
<td>-2.5%</td>
<td>517</td>
<td>180</td>
</tr>
<tr>
<td>MICHIGAN</td>
<td>7,251</td>
<td>-178</td>
<td>-2.5%</td>
<td>517</td>
<td>180</td>
</tr>
<tr>
<td>MARYLAND</td>
<td>1,880</td>
<td>-8</td>
<td>-0.4%</td>
<td>44</td>
<td>14</td>
</tr>
<tr>
<td>NEW JERSEY</td>
<td>1,050</td>
<td>-22</td>
<td>-2.1%</td>
<td>472</td>
<td>14</td>
</tr>
<tr>
<td>NEW MEXICO</td>
<td>1,050</td>
<td>-22</td>
<td>-2.1%</td>
<td>472</td>
<td>14</td>
</tr>
<tr>
<td>NORTH CAROLINA</td>
<td>11,500</td>
<td>-606</td>
<td>-5.2%</td>
<td>1,050</td>
<td>426</td>
</tr>
<tr>
<td>NORTH CAROLINA</td>
<td>11,500</td>
<td>-606</td>
<td>-5.2%</td>
<td>1,050</td>
<td>426</td>
</tr>
<tr>
<td>NORTH CAROLINA</td>
<td>11,500</td>
<td>-606</td>
<td>-5.2%</td>
<td>1,050</td>
<td>426</td>
</tr>
<tr>
<td>PROJECTED</td>
<td>12,500</td>
<td>-654</td>
<td>-5.2%</td>
<td>1,050</td>
<td>426</td>
</tr>
<tr>
<td>TOTAL</td>
<td>41,801</td>
<td>-1,617</td>
<td>-3.9%</td>
<td>2,665</td>
<td>1,339</td>
</tr>
</tbody>
</table>

Sources: NAIC, By-Line By-State Profitability Report; A.M. Best Annual Statement Data; Kramer Associates Analysis
### TABLE 5
Estimated Cost of Rate Suppression
1987–89
(Dollar Values in Millions)

<table>
<thead>
<tr>
<th>State</th>
<th>Eared Pressure</th>
<th>Operating Prof</th>
<th>Ope. Profit as % of Eared Press</th>
<th>Lost Premium</th>
<th>Lost Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALABAMA</td>
<td>1,419</td>
<td>-102</td>
<td>-7.2%</td>
<td>106</td>
<td>157</td>
</tr>
<tr>
<td>ARKANSAS</td>
<td>644</td>
<td>0</td>
<td>0.0%</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>FLORIDA</td>
<td>5,909</td>
<td>-109</td>
<td>-1.8%</td>
<td>1,153</td>
<td>1,080</td>
</tr>
<tr>
<td>GEORGIA</td>
<td>7,297</td>
<td>25</td>
<td>1.5%</td>
<td>2,654</td>
<td>2,395</td>
</tr>
<tr>
<td>KENTUCKY</td>
<td>681</td>
<td>-40</td>
<td>-5.9%</td>
<td>155</td>
<td>166</td>
</tr>
<tr>
<td>LOUISIANA</td>
<td>1,687</td>
<td>-103</td>
<td>-6.1%</td>
<td>485</td>
<td>427</td>
</tr>
<tr>
<td>MASSACHUSETTS</td>
<td>365</td>
<td>-82</td>
<td>-22.7%</td>
<td>75</td>
<td>101</td>
</tr>
<tr>
<td>MISSISSIPPI</td>
<td>640</td>
<td>-53</td>
<td>-8.9%</td>
<td>72</td>
<td>51</td>
</tr>
<tr>
<td>MONTANA</td>
<td>696</td>
<td>-25</td>
<td>-3.6%</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>NEW MEXICO</td>
<td>444</td>
<td>-66</td>
<td>-15.1%</td>
<td>151</td>
<td>136</td>
</tr>
<tr>
<td>NEW JERSEY</td>
<td>1,381</td>
<td>-50</td>
<td>-3.7%</td>
<td>196</td>
<td>131</td>
</tr>
<tr>
<td>NEW YORK</td>
<td>1,025</td>
<td>-70</td>
<td>-6.9%</td>
<td>131</td>
<td>129</td>
</tr>
<tr>
<td>OHIO</td>
<td>2,050</td>
<td>-88</td>
<td>-4.3%</td>
<td>372</td>
<td>358</td>
</tr>
<tr>
<td>OKLAHOMA</td>
<td>460</td>
<td>-55</td>
<td>-12.4%</td>
<td>294</td>
<td>217</td>
</tr>
<tr>
<td>SOUTH CAROLINA</td>
<td>692</td>
<td>-24</td>
<td>-3.5%</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>TENNESSEE</td>
<td>1,846</td>
<td>-47</td>
<td>-2.6%</td>
<td>180</td>
<td>183</td>
</tr>
<tr>
<td>TEXAS</td>
<td>8,646</td>
<td>-1,040</td>
<td>-12.9%</td>
<td>2,238</td>
<td>1,918</td>
</tr>
<tr>
<td>VIRGINIA</td>
<td>738</td>
<td>-73</td>
<td>-10.1%</td>
<td>111</td>
<td>95</td>
</tr>
<tr>
<td>WASHINGTON</td>
<td>1,037</td>
<td>-11</td>
<td>-1.1%</td>
<td>38</td>
<td>44</td>
</tr>
<tr>
<td>TOTALS</td>
<td>48,886</td>
<td>-4,132</td>
<td>-12.4%</td>
<td>8,671</td>
<td>8,090</td>
</tr>
</tbody>
</table>

Sources: NAIC, By-Line By-Count Profitability Report, A.M. Best Annual Statement Data, Kerasier Associates Analysis

leavily concentrated in the restrictive rating states were unable to "scoup" the losses occasioned by rate suppression from other lines and jurisdictions. Among companies for which premium in rate suppression states constituted less than five per cent of their total property and casualty premium volume, average return on surplus in 1989 was 12 per cent. For companies which wrote 10–25 per cent of their total business in rate suppression states, 1989 return on surplus declined sharply to 7.1 per cent, those companies represented 47 per cent of the industry's 1989 assets. For companies which wrote 30 per cent or more of their business in rate suppression states—companies with assets exceeding $30 billion—1989 return on surplus was 3.8 per cent (see Table 6).
### TABLE 6
Distribution of Insurer Groups by Percentage of Rate Suppression, Business Interval (Includes Only Writings of Private Passenger Auto & Workers Compensation)
1989 [Dollar Values in Millions]

<table>
<thead>
<tr>
<th>Private Passenger Auto &amp; Workers Compensation Combined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>0% - 5%</td>
</tr>
<tr>
<td>5.1% - 10%</td>
</tr>
<tr>
<td>10.1% - 15%</td>
</tr>
<tr>
<td>15.1% - 20%</td>
</tr>
<tr>
<td>20.1% - 25%</td>
</tr>
<tr>
<td>25.1% - 30%</td>
</tr>
<tr>
<td>30.1% - 35%</td>
</tr>
<tr>
<td>35.1% - 40%</td>
</tr>
<tr>
<td>40.1% - 45%</td>
</tr>
<tr>
<td>45.1% - 50%</td>
</tr>
<tr>
<td>50.1% - 55%</td>
</tr>
<tr>
<td>55.1% - 60%</td>
</tr>
<tr>
<td>60.1% - 65%</td>
</tr>
<tr>
<td>65.1% - 70%</td>
</tr>
<tr>
<td>70.1% - 75%</td>
</tr>
<tr>
<td>75.1% - 80%</td>
</tr>
<tr>
<td>80.1% - 85%</td>
</tr>
<tr>
<td>85.1% - 90%</td>
</tr>
<tr>
<td>90.1% - 95%</td>
</tr>
<tr>
<td>95.1% - 100%</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Sources: A.M. Best Annual Statement Data, KRAMER ASSOCIATES Analysis

The study does not argue that current levels of rate suppression will cause a systemic property and casualty insurance solvency crisis, although the prognosis might shift if the incidence and severity...
<table>
<thead>
<tr>
<th>TABLE 6 (continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explanation of Terms</td>
</tr>
</tbody>
</table>

**Interval:** the range of RS (rate suppression) premium for the groups described in the row, i.e., data in the row labelled "10-15%" describe groups that write either personal auto or workers compensation and for which RS premium is more than 10% but not greater than 15% of their total premium.

**Groups:** the number of insurer groups with data summarized in the row.

**% of Total Industry:** the percentage of the total industry represented by the data item to the left.

**RS Direct Premium Written:** premium written in personal auto in personal auto RS states or in workers compensation in workers compensation states.

**Total Direct Premium Written:** the all-lines direct premium written for groups summarized in the row.

**Assets:** the year-end reported assets for the groups summarized in the row.

**Earned Premium:** annual premium earned.

**Underwriting loss:** underwriting loss as reported on page four of the annual statement.

**After-tax Income:** net income after tax as reported on page four of the annual statement.

**Surplus:** year-end surplus for the groups summarized in the row.

**Return on surplus:** after-tax income divided by year-end surplus.

**Total:** the sum total for the groups described above as distinguished from the "industry totals" which contain all groups regardless of whether they wrote either line of business.

Of rate suppression continue to increase. At the margin, however, recent levels of rate suppression will increase the number of insurer insolvencies. If the rate regulatory environment does not change, we would expect rate suppression to be implicated more often as a factor contributing to insolvencies in the years to come.
In the years preceding their insolvency, insurers which became insolvent over the 1985–89 period wrote larger percentages of their total business in rate suppression states than did healthy insurers. In addition, companies that later became insolvent were nearly twice as likely as healthy insurers to have written over 20 per cent of their business in rate suppression states. The data suggest that in a significant minority of cases, rate suppression may have been a factor in the demise of companies that failed in the late 1980s. At a minimum, companies that later became insolvent suffered more from rate suppression than did healthy insurers.

Similarly, the “weakest” segment of the property and casualty insurance industry [based on net worth ratios and earnings] bore a disproportionate share of the rate suppression burden. Table 7 shows premium written in rate suppression states as a percentage of total premium written for four classes of companies: 1) the entire property and casualty industry, 2) 301 “weak” companies, 3) all insurers excluding weak companies, and 4) 12 insurers which became insolvent over the 1985–89 period, and for which historic data were available. The so-called “weak company” segment was comprised of the 20 per cent [based on assets] or the industry with the lowest net worth to assets ratios, plus all companies which had average negative after-tax income over the 1987–89 period; this weak company category represented 21.2 per cent of the industry’s 1987–90 admitted assets.¹

Within each of the four classes, companies were then categorized according to the percentage of total premium volume written in rate suppression states. Thus in Table 7 the top line of the first vertical column indicates premium written in rate suppression states by the industry as a percentage of total premium written; the second line of the column reflects the percentage of the industry writing between 10 and 15 per cent of its total premium volume in rate suppression states; the third line indicates the percentage of the industry writing between 15 and 20 per cent of its total business in such states, and so forth.

¹ The reason the weak company category only slightly exceeded 10% of the industry assets was that there were a small number of companies with negative earnings over the 1987–89 period, and most of those companies had already qualified for inclusion on the list by virtue of their relatively low net worth levels.
## TABLE 7
Distribution of Insurers by Percentages of Rate Suppression Premium Written

<table>
<thead>
<tr>
<th>All Companies (1)</th>
<th>Non-weak Companies (2)</th>
<th>&quot;Weak&quot; Companies (3)</th>
<th>Insolvent Companies (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of RS Premium written</td>
<td>20.6</td>
<td>13.6</td>
<td>79.1</td>
</tr>
<tr>
<td>% Writing 10-15% Below Reserve</td>
<td>21.0</td>
<td>13.9</td>
<td>75.7</td>
</tr>
<tr>
<td>% Writing 16-25% Below Reserve</td>
<td>27.7</td>
<td>15.0</td>
<td>76.9</td>
</tr>
<tr>
<td>% Writing 26-40% Below Reserve</td>
<td>15.0</td>
<td>12.9</td>
<td>19.9</td>
</tr>
<tr>
<td>% Writing 41-50% Below Reserve</td>
<td>17.5</td>
<td>10.3</td>
<td>19.8</td>
</tr>
<tr>
<td>% Writing 51-60% Below Reserve</td>
<td>9.0</td>
<td>6.9</td>
<td>13.8</td>
</tr>
<tr>
<td>Number of Companies</td>
<td>2,374</td>
<td>1,777</td>
<td>701</td>
</tr>
</tbody>
</table>

---

(1) The data for "all companies" are based in 1986.
(2) "Non-weak companies" refers to all companies except "weak" companies (21%-25%).
(3) "Weak companies" (21%-25%) are those which attained an average rate of new reserves over the 1967-88 period which was not at least 10% above the overall average rate in that period.
(4) The data for insolvent companies are based on the year of liquidation.

Sources: A.M. Best Annual Statement Data, Kramer Associates Analysis

All told the weakest companies wrote about a 50 per cent greater share of their total business in rate suppression states than did other insurance companies. Among the "weak" insurers that wrote more than 30 per cent of their total business in rate suppression jurisdictions, operating losses from rate suppression between 1967 and 1989 appear to have equaled more than one-third of their year-end 1989 net worth. As a group, the companies that have suffered most from rate suppression were those with the least financial capacity to absorb the losses. A significant amount of loss was absorbed by "local concentrators"—firms for which private passenger auto or workers compensation business in one state represented 10-20 per cent or more
### TABLE 8
Comparison of Firms Concentrating on Local Markets
1989
(Dollar Values in Millions)

#### Private Passenger Automobile—Local Concentrators

<table>
<thead>
<tr>
<th>Number of Groups</th>
<th>Aggregate Ceded Rate</th>
<th>Aggregate Limits</th>
<th>Aggregate PLI**</th>
<th>Aggregate Excess</th>
<th>On-Rated</th>
</tr>
</thead>
<tbody>
<tr>
<td>15% Threshold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceded States</td>
<td>50</td>
<td>109.6</td>
<td>250</td>
<td>528</td>
<td>6,105</td>
</tr>
<tr>
<td>Other States</td>
<td>281</td>
<td>108.7</td>
<td>210,288</td>
<td>2,682</td>
<td>67,220</td>
</tr>
</tbody>
</table>

15% Threshold

| Ceded States     | 61                   | 116.4           | 250             | 528             | 6,105    | 5.16     |
| Other States     | 297                  | 115.7           | 210,288         | 2,682           | 67,220   | 6.05     |

20% Threshold

| Ceded States     | 66                   | 112.3           | 250             | 528             | 6,105    | 5.16     |
| Other States     | 321                  | 111.6           | 210,288         | 2,682           | 67,220   | 6.05     |

#### Workers Compensation—Local Concentrators

<table>
<thead>
<tr>
<th>Number of Groups</th>
<th>Aggregate Ceded Rate</th>
<th>Aggregate Limits</th>
<th>Aggregate PLI**</th>
<th>Aggregate Excess</th>
<th>On-Rated</th>
</tr>
</thead>
<tbody>
<tr>
<td>15% Threshold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ceded States</td>
<td>50</td>
<td>112.5</td>
<td>250</td>
<td>528</td>
<td>6,105</td>
</tr>
<tr>
<td>Other States</td>
<td>104</td>
<td>111.6</td>
<td>210,288</td>
<td>2,682</td>
<td>67,220</td>
</tr>
</tbody>
</table>

15% Threshold

| Ceded States     | 50                   | 122.0           | 250             | 528             | 6,105    | 5.16     |
| Other States     | 104                  | 121.3           | 210,288         | 2,682           | 67,220   | 6.05     |

20% Threshold

| Ceded States     | 50                   | 120.9           | 250             | 528             | 6,105    | 5.16     |
| Other States     | 104                  | 120.3           | 210,288         | 2,682           | 67,220   | 6.05     |

Sources: A.M. Best Annual Statement Data & Kramer Associates Analysis

1 Defined as a group for which more than the threshold percentage of writings are in the class, e.g., groups who write more than 60% of their total business in personal auto in one EL state

2 Net Income After Tax

of a given company's total premium volume. Table 8 shows the size and performance of local concentrators, and the substantial disparities in earnings between those that are locked into rate suppression jurisdictions and those concentrating in other states. Thus, there are 79 insurer groups which wrote at least 10 per cent of their total business (indicated by "10% Threshold" in the table) in one automobile
rate suppression state, compared to 281 groups that wrote 10 per cent or more of their business in one automobile non-rate suppression state. Local concentrators frequently serve as a rough proxy for small, locally-oriented firms. Local concentrators in rate-suppression states showed substantially worse overall financial results than did firms which concentrated in non-rate-suppression states. The greatest victims of price controls are not the large nationwide carriers, which have some flexibility to re-deploy capital (except from those jurisdictions with powerful regulatory exit barriers). The companies paying the highest price are locally oriented insurers locked into rate suppression jurisdictions.

**Rate-of-Return Regulation**

**Introduction**

In an increasing number of states, the trend towards rate suppression has involved the displacement of traditional forms of “prior approval” regulation by “rate-of-return”—or “public utility” model-regulation. Rate-of-return regulation inherently entails government intervention regarding capital levels, costs, profits, and a broad range of decisions that are ordinarily left to management subject to the constraints of free market competition.

Rate-of-return regulation derives from the regulation of traditional public utilities such as local water, gas, and electricity supply. The departure from market-oriented regulation is justified by the peculiar structural characteristics of those industries: natural monopoly and the providing of homogeneous products. Rate-of-return regulation is utterly inappropriate for the property and casualty insurance industry. Although its well-meaning proponents believe it will benefit consumers, public utility-style regulation would actu-

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3. This result has occurred from either legislative or administrative adoption of rate-of-return regulation, or as a response to judicial requirements that more drastic "rollback" measures be limited to provide insurers with a fair "rate-of-return."

4. A natural monopoly is an industry that is characterized by declining average costs as output increases. In a natural monopoly, the entire supply for a given market can be provided most cheaply by a single firm. Given this cost advantage, the monopolist can drive potential competitors out of business and generate supra-competitive profits. In the monopoly setting, rate-of-return regulation constitutes an attempt to simulate the constraints of a competitive market.
ally exacerbate current availability and affordability problems by driving out capital from affected insurance markets and penalizing the most cost-effective insurers. Rate-of-return regulation would be an administrative nightmare, likely to generate protracted proceedings with complex and detailed regulations, or rigid, mechanical rules that fail to reflect the myriad of differences among lines of insurance, territorial areas, and individual firms. Moreover, none of these harms and costs could be justified by any of the structural features of insurance markets. Instead of domination by natural monopolies, property and casualty lines are competitive industries characterized by relatively low levels of concentration and relative ease of entry. Due to this, competitive pricing will provide greater benefits for consumers.

Harmful Consequences of Rate-of-Return Regulation

Threat to Capital. Rate-of-return regulation is likely to drive capital out of the insurance industry, thereby exacerbating availability and affordability problems and reducing protection against insolvency. Significant reductions in capital are especially likely for local insurers. At the margin, multi-state insurers also will be induced to shrink capital, depending on their volume of business in affected lines and states. They also will have an incentive over time to withdraw from these lines and states, thus leaving more of the market to be served by insurers with reduced levels of capital. These effects of rate-of-return regulation are inherently harmful. The spread of these policies to more and more states would be a recipe for disaster.

The threat to capital from rate-of-return regulation derives from the interplay of features intrinsic to this mode of regulation with the political climate in which it is likely to be implemented. Rate-of-return regulation involves government determination of both a rate of return and a rate base against which that rate is to be applied. As the current California experience wish implementing Proposition 103 demonstrates, the rate suppression philosophy is likely to tilt the calculations to hold down both permitted rates-of-return and the base against which that rate is applied. This bias is clearly evident in proceedings to apply the rate rollback provision of Proposition 103 as modified by the California Supreme Court. The most recent rollback order would require an insurer to make refunds to policyholders...
if its calculated rate-of-return during the rollback year exceeded 10 per cent. In addition, many insurers would be forced to use an artificially low surplus base (see below), and would not be allowed to deduct their full operating expenses in calculating their rates-of-return. Even if the understatement of surplus and operating expenses is ignored, the general consensus of financial analysts is that, given the returns available from alternative forms of investment, a 10 per cent target rate-of-return would be too low to attract capital to the insurance industry on an ongoing basis. Moreover, the effect of a 10 per cent ceiling on insurer returns during the rollback year would drive the industry-wide rate-of-return well below 10 per cent—even if the calculation did not require surplus and operating expenses to be understated.

The ultimate outcome of the rollback proceedings in California is uncertain. It also is not yet clear whether rate-of-return ceilings will be proposed for future years. Although a few states have "excess" profit laws, that require insurers to make refunds under certain conditions, rate-of-return regulation customarily employs a target rate-of-return in the rate determination or approval process, rather than a ceiling. If the actual return for an insurer over the period of coverage does not meet the target (as has been much more common in practice), the insurer cannot charge policyholders for the shortfall.

Establishing a rate-of-return ceiling, which limited each insurer's earnings to no more than a specified fair rate-of-return, would necessarily drive the average return in a given year below the specified fair level. This is because some insurers will have returns below the ceiling but, by definition, none will be allowed to have returns above the ceiling. Similarly, applying a ceiling to the industry's ag-


6. For further discussion, see Robert A. Litam, Written Testimony Before the Insurance Commissioner in the State of California in the Matter of Determination of Rate of Return, Leverage Factor, and Projected Yield of 1989 Rate Calculations (May 9, 1996).
aggregate rate-of-return would necessarily reduce the average aggregate return over time below the ceiling, because high returns in good years would not be available to balance out low returns in bad years.

Even if rate-of-return regulation employs a target rate-of-return rather than an actual ceiling, pressure for low rates may translate into a target that induces insurers to reduce capital. In addition, political factors in determining the rate base are likely to compound further the effect of driving out capital. Rate-of-return regulation for a given line of business requires specifying the amount of surplus that is assumed to support writings in the given line. The political desire to hold down premium rates will tend to yield regulatory norms with the highest possible premium-to-surplus ratio.

In a telling example, the California Department of Insurance proposed a premium-to-surplus ratio of 3:1 in its initial rollback order in 1989, that was subsequently trimmed to 2.5:1, and promulgated in August, 1991, at 2:1. But for the property and casualty insurance industry, the nationwide average premium-to-surplus ratio was 1.56:1 at year-end 1989, with 64 of the nation's 100 largest property and casualty insurers writing at or below the 2:1 ratio, and 39 of the top 100 writing at or below 1.6:1.7

In other words, if California's approach is extended to other jurisdictions, then billions of dollars of surplus will be deemed "excessive" and, in effect, deducted from insurer surplus for the purpose of calculating the base against which the allowed rate-of-return is to be applied. Depriving insurers of the opportunity to earn a return on this portion of their surplus is tantamount to ordering them to withdraw it from the market. Without the ability to earn a return on these sums, insurers would ultimately either withdraw from the market or write new policies at a premium-to-surplus ratio higher than they would otherwise deem prudent. Either result would be a bizarre goal for regulatory policy.

Encouraging insurers to write more premium-per-unit of surplus than would otherwise be prudent obviously increases insolvency risk. Surplus provides security to policyholders for unexpected increases in claim-costs, such as those resulting from natural disasters

like earthquakes and hurricanes, and reductions in asset values. But limiting the amount of surplus that can go into the rate base and rewarding insurers who leverage their capital to write more and more premium stretches that surplus thin and erodes the security against insolvency that surplus is intended to provide.

The problems attendant on regulatory proscription of a premium-to-surplus ratio that deviates significantly from the ratios produced by the market are compounded by the practice in rate-of-return states of establishing premium-to-surplus ratios for particular insurance lines and specific jurisdictions. This requires the specification of an allowable amount of surplus for each line and state. But an insurer’s surplus is inherently indivisible. Any attempt to allocate surplus to particular lines and states will be arbitrary and to a great extent contrary to the very principle of diversification of risk upon which insurance itself rests, and it will lead to distortions in the supply of coverage.

Insurers maintain surplus in addition to reserves to permit them to pay claims that may exceed what has been set aside in reserves. A multi-line insurer will not know in advance which of its many lines may experience such an excess of claims, and therefore will maintain surplus to back its ability to pay claims across all lines. Line-specific surplus limits are inconsistent with this purpose, and they might be especially burdensome, if not unrealistic, for large insurers that write numerous lines of business. Similarly, line-specific and state-specific allocations of surplus will produce fluctuations in the supply of coverage. A ratio that allocates less surplus than an insurer feels is necessary to write a given level of coverage will lead the insurer to contract supply or perhaps reduce quality for that line of business, while a ratio that allocates more surplus than the insurer believes is appropriate will lead to an expansion of supply for the given line.

Disincentives for Efficiency A second major problem with rate-of-return regulation is that it can discourage efficient operations.

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8. Litin, Note 7 supra.

9. Rate-of-return regulation (and, in this case, other forms of prior approval) also may require allocation of investments income and certain operating expenses by line and state. Any regulatory formula for such allocations will only be approximate, and the errors will often vary across insurers writing coverage in any given line and state. While perhaps less problematic than surplus allocations, these errors can nonetheless lead to distortions in the supply of coverage.
This problem is well-known in public utility regulation. On the one hand, if utilities know that they will be compensated for all capital and operating expenditures, incentives to control operating expenses are reduced and incentives to expand capital investment are increased. On the other hand, incentives for development of cost-saving technology and methods will be low if rate-of-return regulation limits profitability on new investment. Government supervision and control of operating and capital costs, which have long been an integral part of utility regulation, might help control incentives for utilities to overspend. However, these methods do not encourage utilities to adopt cost-saving innovations.

When rate-of-return regulation is applied to insurance, excessive expenditures are not likely given competition in the market—inurers must still compete for business even if their rate-of-return is regulated. Even if excessive expenditures could produce higher regulated rates for an insurer, the higher rates would likely cause a reduction in the insurer’s market share. As a result, the existence of competition significantly undermines the case for limits on operating expenses (and capital investment) under rate-of-return regulation for insurance companies.

However, the problem of providing sufficient incentives for the development and expansion of cost-saving methods does arise when rate-of-return regulation is applied to insurance. If insurers are limited to a specific rate-of-return on capital, the potential for increased profits from developing new procedures that reduce operating expenses largely disappears. As a result, they will be less likely to fund such investments, and expenditures for research on cost-saving or service-enhancing innovations will decline. By constraining the allowed rate-of-return, incentives for entry and expansion by low-cost providers are also reduced. Indeed, the application of rate-of-return regulation can have the perverse effect of penalizing the most efficient providers. This is because the firms with the highest returns in competitive environments are likely to be those that have developed superior methods of operation that allow consumers to be met at a lower price. 15

15. For further discussion of this issue and evidence that some California auto insurers with the lowest prices also had the highest profits see George L. Priest, The Effects of Proposition 103 on Consumers and on Competition in Property/Casualty Insurance, Committee on Proposed Regulations, Commissioner John Garamendi, California Department of Insurance [April 8, 1991] (hereafter “The Effects of Proposition 103 on Consumers and on Competition in Property/Casualty Insurance”).
Straitjacket Regulation Rate-of-return regulation is premised on the assumption that competition is inadequate to protect consumer interests, and thus the state must intervene to improve market performance. As already noted, regulators must determine what rate-of-return will be allowed on the capital invested in assets and facilities used to provide the regulated service. Because capital investments in facilities, plant and equipment, and operating expenses are ordinarily considered part of the rate base to be passed on to utility customers, firms subject to public utility-style regulation have little incentive to control their capital expenditures or operating costs. Accordingly, public utility regulators must engage in detailed reviews of capital investment and operating costs to determine what expenses will be permitted and what expenses will be capped or disallowed.

Such an enormous regulatory task will be manageable only if the products or services involved—typically, water or electricity—and consumer demand for that product or service, are broadly homogeneous, with supply and demand relatively stable over time. As the history of regulation in fields like trucking and passenger air travel indicate, attempts to apply rate-of-return regulation to industries marked by product and consumer diversity and rapid changes in product characteristics and consumer demand have harmed rather than helped consumers.

The property and casualty insurance market is characterized by substantial diversity among insurers and insureds. Insurers differ significantly in terms of product mix, investment strategy, and capitalization. Even within a given line of business, they vary widely in terms of marketing strategies and distribution methods (e.g., independent agents, exclusive agents, mail order), underwriting standards (e.g., preferred risk, standard, or non-standard) and coverage details. Different classes of insureds have different costs and risk characteristics, different demands for service and quality, and different propensities to remain with the same insurer. These differences in buyer characteristics produce wide variations in the cost of coverage and help explain the diversity in insurer operations.

In theory, to simulate the effects of a working, competitive market, regulators under a public utility model would have to inquire into these and myriad other supply and demand characteristics for each line, geographic area, and demographic class of insureds. Since it is not unusual for well over a hundred insurers to operate in a
given line and state, the diversity among insurers would quickly overwhelm any attempt by regulators to engage in the necessary close supervision of insurer costs on a company-by-company basis that the competitive market-simulation goal would require. It would be impossible for utility-style regulation to take into account the diversity that exists in property and casualty insurance markets.

Thus, regulators will be under enormous pressure to develop standards and norms that apply to broad groups of companies, if not the entire industry. These standards and norms ignore the real differences that exist among companies. Moreover, implementing such broad standards and norms across firms with different market strategies, coverages, risk characteristics, and cost structures will almost certainly cause dislocations and drive diversity out of the market-place. This will substantially constrain competition and the variety of alternatives available to consumers. In contrast to utility-style rate-of-return regulation, traditional forms of prior approval regulation have not entailed efforts by regulators to define appropriate firm cost structures. The focus has been, instead, on the reliability of the data used to support rate filings, whether proper actuarial methods have been used to project losses, and, more recently, whether investment income is reflected in some sensible way. These systems have allowed meaningful regulatory monitoring without wholesale substitution of regulatory judgment for management decision-making, and they have accommodated desirable diversity among insurers.

Regulatory Lag All forms of price regulation are prone to regulatory lag, that is, the lapse in time between changes in underlying marketplace forces and the regulatory response to those changes. Such delays are inevitable given the need to process all firm and industry responses through the administrative steps required for agency approval. But regulatory lag is likely to be far more acute in the context of rate-of-return regulation and is likely to be particularly damaging in property and casualty insurance given the cyclical nature of the market.

The duration of a regulatory proceeding—and hence the extent of regulatory lag—is likely to be a direct reflection of the complexity of the underlying regulatory issues. In rate-of-return regulation, which involves government review of all aspects of the regulated business, regulation is particularly intrusive and complex. Rate-of-
return regulation in some states has produced long and costly rate
hearings in which insurance industry employees, state government
employees, consultants, advocates, other experts, and counsel for all
parties engaged in detailed arguments concerning loss projections,
allowable operating expenses and capital, and the rate-of-return
needed by insurers. 11 During a period of chronic increases in the costs
of providing coverage, regulatory lag can lead to de facto rate sup-
pression even if requested increases are granted; by the time rates
are approved, they are already inadequate.

Regulatory lag has the potential to be especially costly for the
property and casualty insurance industry given the cyclical nature
of the market. Many lines of business are characterized by periodic
soft and hard markets. During soft markets, premium rates are stable
or falling and many insurers seek to write coverage. Hard markets
involve sharp premium increases and reductions in the number of
suppliers. The causes of volatility in premium and in the availability
of coverage are not fully understood, but the ability to raise prices
during hard markets undoubtedly mitigates the severity ofavail-
ability problems, especially since price increases encourage influ-
nations of new capital to support sales. 12 Cyclical fluctuations in
the supply of personal auto and workers compensation insurance have
been less pronounced in recent years than those for commercial li-
ability insurance. Nonetheless, regulatory lag associated with rate-
of-return regulation could significantly aggravate availability prob-
lems and increases in residual market share for these lines during
hard markets.

Administrative Difficulties Inherent in Rate-of-Re-
turn Regulation As noted earlier, to apply rate-of-return regula-
tion, a rate base, other allowable costs, and the allowed rate-of-re-
turn—all must be specified. None of these items can be measured
precisely. Unavoidable errors will lead to market dislocations, and

11. See, The Use of Investment Income in Massachusetts Private Passenger
Automobile and Workers’ Compensation Rate Setting, Note 5 supra, for detailed dis-
cussion of this issue for auto and workers compensation rate hearings in Massachu-
setts.

12. See, NAIC, CYCLES AND CRISES IN PROPERTY/CASUALTY INSURANCE: CAUSES
AND IMPLICATIONS FOR PUBLIC POLICY (Cornell, Houghton & Kron, eds.,1991)
(Hereafter “CYCLES AND CRISES IN PROPERTY/CASUALTY INSURANCE: CAUSES AND IM-
PPLICATIONS FOR PUBLIC POLICY”).
contemporary political pressure to achieve low rates will make matters worse.

The Rate Base. In addition to the politically-charged question of the proper premium-to-surplus ratio, which has already been discussed, rate-of-return regulators must resolve the knotty issue of the proper measurement of a firm’s economic surplus. Given the lack of a generally accepted economic definition, political considerations are likely to play a role here, too. Possible choices for a rate base for the property and casualty insurance industry include the book value of net worth (surplus) calculated according to statutory accounting principles ("SAP") or generally accepted accounting principles ("GAAP"). In general, neither SAP nor GAAP surplus will equal economic surplus, although GAAP surplus is likely to be much closer on average. Differences arise from the failure to discount loss reserves and to report the estimated market value of bonds. Obtaining accurate values is difficult in both cases, especially for loss reserves. Many insurers also have substantial assets that reflect the value of investments in distribution systems, product development, claims facilities, and "human" capital that are not included in reported surplus (or income).13

Reasonably accurate measurement of the value of these assets is not feasible in most instances, but excluding them from the rate base would likely lead to an undesirable reduction in similar investments in the future—even if over time this in turn leads to higher overall operating expenses. Unfortunately, problems in measuring economic surplus and the desire for administrative tractability favor the use—whether explicit or implicit—of either GAAP or SAP surplus. Since SAP surplus usually is less than GAAP surplus, pressure for low rates may lead to the former being used.

Loss Projections. All forms of prior-approval rate regulation involve regulatory approval of insurer loss projections. In contrast to traditional methods of regulation, rate-of-return regulation has often involved lengthy debate over projections submitted by competing experts. In some instances, pressure for low rates has led to the use of projections that have understated future losses significantly.14

13. Problems of this nature are discussed in detail in Kramer, Note 1 supra, Ch. 4, Other Costs of Rate Suppression at 67-72 (1992).
14. See, for example, the discussion in The Use of Investment Income in Massachusetts Private Passenger Automobiles and Workers’ Compensation Ratemaking and Price Regulation in U.S. Automobile Insurance, both at Note 5 supra. The letter
Rate-of-return regulation for utilities conventionally is based largely on historical costs of providing services, along with specified procedures for allowing for future increases in labor or fuel costs. Insurance ratemaking is not amenable to these simple procedures. The magnitude of insurance claim costs is much less certain than utility costs, and the magnitude of costs becomes known much more slowly than for utilities. Either or both of these problems are especially pronounced for long-tailed lines, such as liability and workers’ compensation. Gives pressure for low rates, these problems make it easier for regulators to employ overly optimistic projections of losses.

Proper insurance ratemaking requires the application of loss development factors to historical data on paid or incurred claim costs and projection of the percentage increase in claim costs that is likely to occur for the forthcoming coverage period. Loss projection is not an exact science. Complex concepts are important, and informed judgment often plays a significant role. Moreover, considerable heterogeneity in expected claim costs often exists among insurers that write business in a given line or state. Attempts to use fixed formulas and procedures to project losses under rate-of-return regulation would likely lead to serious distortions in the supply of coverage, and they would have unequal effects across companies. Attempts by regulators to conduct a detailed analysis of the anticipated loss experience for each company and line of business would lead to costly duplication of insurer activities.

Expense Limitations. Problems would also arise if regulators attempted to employ expense ceilings or restricted categories of allowable expenses or if an attempt was made to determine whether particular expenses were justified on a case-by-case basis. Although the desire for lower premiums creates pressure for limiting allowable expenses in rate filings, limitations on operating expenses that otherwise would be reflected in competitive premium rates can promote undesirable uniformity and affect adversely the supply of coverage, product quality, or both.

Study presents evidence that proponents of lower auto insurance rates in Massachusetts have repeatedly and significantly underestimated loss costs, as have the projections finally adopted by the insurance commissioner.

15. Expense limitations are an integral part of proposed rate rollbacks and rate-of-return regulation in California. Some states with rate-of-return regulation specify allowable expense ratios. A few states limit an insurer’s allowable expense ratio relative to some benchmark for a broad class of companies.
Expense ceilings will produce inequities and distort efficient behavior. "Caps" produce inequities because expenditure levels vary from company to company even among the most efficient firms, according to business mix, nature of service and product provided, differences in distribution system, and differences in customer base. Some of these disparities—e.g., differences in distribution system—cannot always be rectified by an individual company on a cost-effective basis. If a company is compelled to comply with an expense ceiling that is inadequate in view of the underlying nature of its operations and target market, the company will redeploy assets to other lines of business or other activities.

The point is simply that in any industry, different competitors have different cost structures that reflect heterogeneity in marketing methods, services, and consumer demand. These cost differentials lead to differences in prices charged by competing firms. Consumers benefit from this diversity. Arbitrary expense ceilings cannot accommodate the myriad of factors that lead to cost differences among firms in a dynamic, competitive environment. To the extent that arbitrary expense ceilings induce insurers to reduce expenses below optimal levels, the total costs that ultimately are passed on to consumers actually might rise. More importantly, to the extent that individual insurers are unable to reduce expenses to the level implied by some artificial ceiling and suffer inadequate returns as a consequence, capital will ultimately be redeployed to other activities. Competition and the supply of coverage will suffer and choices available to consumers will decline.

Moreover, there is no need for close scrutiny of insurer expenses. Although politicians and the media have gained extensive mileage through hyperbolic claims about alleged "waste" or "excessive" executive compensation in the insurance industry, the fact is that the same rhetorical assertions could be made about virtually every other industry. Ordinarily, we do not assume that government will police industry costs or review executive compensation; instead, we trust that these factors will be controlled by marketplace competition. Insurers, like other competitive firms, have no incentive to inflate expenses but have direct incentives to reduce expenses. Whatever a particular insurer's level of efficiency, added expenses reduce profits immediately, and, as noted earlier, will cause an insurer's competitive standing to erode even if the same expenses could be used to justify a higher regulated rate in the future. Thus, in a competitive
environment, it already is in the interest of every insurer to optimize expense levels. Of course, this does not necessarily mean minimizing any particular category of expense; it means setting expenses within any given category at a level that would minimize overall insurer costs commensurate with providing the level of quality that is desired by consumers. Although some proponents of rate-of-return regulation have argued that competition in the insurance industry is imperfect, the fact is that virtually no market meets the economist's definition of perfect competition. The issue is whether the imperfections in insurance markets are any worse than those encountered in other industries where we leave basic decisions concerning costs and prices to market forces. As will be demonstrated below, insurance markets are, indeed, highly competitive and, thus, the inefficiencies and disclosures unnecessarily attendant on regulatory prescription of cost ceilings and permissible expense categories are entirely unjustified.

The Allowed Rate-of-Return. Rate-of-return regulation obviously requires specification of an allowed or target rate-of-return. The allowed rate-of-return should reflect the return available from investing in riskless assets plus a premium to compensate for risk, but there is no consensus among either academic theorists or practitioners as to how this can best be achieved. Disagreement exists as to the type of risk that should be compensated (e.g., market risk, firm-specific risk, or both) and how to best measure any given type of risk. As a result of differences in operations, risk also will vary across companies in ways that cannot be precisely measured.

Precision is not possible—but some number (or set of numbers) must be chosen if rate-of-return regulation is to be used. Regulatory targets will surely differ from expected returns that would arise from competitive market forces. Considerations of regulatory manageability will create pressure for ignoring differences in required returns across companies. Pressure for low premium will translate into pressure for low target rates of return. Small differences in target rates of return have only a minor impact on premium rates, but can have a major impact on the supply of coverage. If the target rate-of-return is pushed below the level that a firm's management perceives as necessary to justify writing coverage, the firm ultimately will exit.

It has been argued that the highly imperfect process of specifying an allowed rate-of-return in the regulation of public utility rates is necessary to reduce the adverse consequences of monopoly prices that
otherwise would be charged. This argument cannot be used to justify rate-of-return regulation in competitively structured insurance markets. Instead, rate-of-return regulation will result in unavoidable errors that will have undesirable and perhaps unanticipated impacts on the supply of coverage. The emphasis of rate-of-return regulation on reducing premium rates will produce all of the costs associated with rate suppression that have been detailed earlier in this study.

Given competition, there is no compelling economic basis for more traditional forms of prior approval regulation of insurance rates. However, if rate regulation is to be used in a given state, it is best to provide as much flexibility to insurers and as much deference to management judgment as possible. When determining whether a rate filing meets statutory standards that rates be adequate but not excessive or unfairly discriminatory, it is desirable to consider the maximum extent possible the beneficial effects of competition.

The Competitive Nature of Insurance Markets

The fastest, most effective, and most consumer-oriented form of market discipline is marketplace competition. The goals of the proponents of rate-of-return regulation—prevention of "excessive profits," control of insurer costs, assurance that surplus will not be excessive—can all be attained through marketplace competition, without the delays, distortions and inefficiencies that accompany public utility-style regulation. Put another way, public utility-style regulation can be justified in terms of benefits to consumers only in the natural monopoly setting, where competition is unavailable to control monopoly pricing.  

16 Even in the case of natural monopoly, there has been a growing recognition among economists that rate-of-return regulation may lead to market defects and distortions in incentives for efficient production. No regulatory agency is capable of taking into account the differences among consumers with respect to their uses of the regulated product or service. Thus, in determining the appropriate price structure, regulators must make crude distinctions among limited categories of consumers over highly constrained time periods. The regulatory process is a blunt instrument, unable to take into account or to anticipate the changes in costs, input prices, and consumer demands. This has generated significant skepticism among industrial organization scholars as to whether total rate-of-return regulation is appropriate in any industrial context. See, D. BRANCKO & D. SAPPHINSTON, DESIGNING REGULATORY POLICY WITH LIMITED INFORMATION (1987).

There is a rapidly growing academic consensus that "price cap" regulation—in which the regulatory agency sets a maximum rate below which the regulated firm...
turn ceilings and cost-of-service rate regulation to competitive industries like airlines, natural gas and trucking demonstrates that public utility regulation will impose large and wholly unnecessary costs on a competitive market. The key point is that the property and casualty insurance industry is characterized by competitive markets, not natural monopolies. The structural characteristics and evidence of performance in insurance markets are completely at odds with the economic rationale for rate-of-return regulation.17 The evidence refutes the arguments by some observers that the industry suffers from lack of competition, excessive profits, and gross inefficiency.

Market Structure  Market structure and ease of entry are conducive to competition in auto insurance, workers compensation, and other property and casualty lines. A key element of market structure is market concentration, which refers to the share of the market written by large firms. Economic theory holds that market structure and performance are related, and that anti-competitive behavior and efforts to impose market power over prices are difficult to sustain in a fragmented market. Thus, low concentration ratios are considered particularly persuasive evidence of competitiveness. Though there is no universally accepted criterion for measuring the point at which market concentration becomes high enough to produce significant deviations from competitive behavior, concentration is relatively low for most property and casualty insurance lines of business compared to other large industries. Concentration is especially low when measured for the nationwide market for a given type of coverage, and national values are more relevant than state values in view of

the ease with which insurers can expand writings into additional states. Even at the state level, concentration levels are generally moderate in personal auto and workers compensation insurance, as is illustrated by Tables 9 and 10, which show Herfindahl-Hirschman indices and market shares of the largest four and eight insurer groups for 1989 by state according to rate suppression classifications.18 Most of the values shown in these tables are low-to-moderate compared to many major industries and would be considered by most economists as conducive to competition. There is no evidence that concentration differs substantially between rate suppression and non-rate suppression states. There is, therefore, no special justification for rate suppression in the states that have adopted rate suppressive policies.

**Ease of Entry** For several states, the values shown in Table 9 indicate an arguably high level of concentration [although some of this may be caused by rate suppression and its possible effect of driving out firms from particular lines or jurisdictions]. In addition, given the lack of standard benchmarks for use in assessing the level of market concentration and defining the appropriate market, some observers of the industry have disputed the conclusion by economists that levels of concentration in the property and casualty insurance industry are conducive to competition. But it is fundamental that collusion is unlikely to raise prices even in highly concentrated markets if significant entry barriers are absent, since in this case potential entry can deter non-competitive behavior.

It is a well-known fact that barriers to entry in the property and casualty insurance industry are quite low. Unlike true natural monopolies like electric or water utilities, the insurance business does not require a large front-end capital investment in non-liquid or highly specialized plants, equipment or other fixed assets. The capital assets of an insurer consist primarily of funds invested in highly liquid investment vehicles. As the Subcommittee on Oversight and Investigations of the House Energy and Commerce Committee

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18. The Herfindahl-Hirschman index is defined as the sum of the squared market shares (in per cent) for firms in a market. It assumes a value of 10,000 for a monopoly and 100 for a market with 100 firms of equal size. For detailed discussion of market structure in personal auto and workers compensation insurance, see "Competition in Private Passenger Automobile Insurance," and Regulating Competition: The Case of Workers' Compensation Insurance, both at Note 17 supra.
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11 Nevada, North Dakota, Ohio, Washington, West Virginia and Wyoming have exclusive non-RS states, and are therefore not included.

* Based on the top 50 writers (groups) in each state, excluding state funds
Sources: American Insurance Association, Insurance Services Office, Inc.; Kramer Associates Analysis
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1 Based on the top 50 writers (groups) in each state, excluding state funds

**Sources:** AMERICAN INSURANCE ASSOCIATION, INSURANCE SERVICES OFFICE, INC.; KLASER ASSOCIATES ANALYSIS
noted at the outset of its recent study of the property and casualty insurance industry.\textsuperscript{19}

insurance is an easy business to enter. Because making promises does not require expensive plants and equipment or time-consuming construction, all that is really necessary is to meet regulatory capital and skill requirements, and convince potential customers that the promise of insurance will be honored at an attractive price.

As a result, if prices were to rise above the expected cost of providing coverage in any particular line or jurisdiction with a higher level of concentration, existing insurers could readily expand their writings and other insurers could easily expand into those lines or jurisdictions, forcing prices back down to competitive levels.

\textbf{Diversity of Product}  Unless restricted by regulation, the property and casualty insurance market for most lines of business also is characterized by considerable diversity in prices, underwriting and rate classification systems, levels of service, and product distribution systems. This diversity would make effective cooperation to raise prices exceedingly difficult. Moreover, this diversity in prices, underwriting criteria, and rate classification is \textit{prima facie} inconsistent with price-fixing. While less diversity exists along these dimensions in workers compensation insurance in many states in conjunction with regulation, there is nonetheless substantial evidence of competition through rate deviations and dividend payments.

This diversity of product, levels of service, and marketing practice also disposes of the argument that the industry's limited anti-trust exemption under federal law and the laws of many states has facilitated price-fixing. Market diversity and specific factors such as independent rate filings,\textsuperscript{20} rate deviations, widespread use of individual risk rating for commercial coverages, and dividend plans for workers compensation insurance make collusive practices far more difficult to undertake or sustain. Indeed, the ability of insurers to use


\textsuperscript{20} Most large auto insurers use independent rate filings; that is, they do not rely on prospective loss costs or other ratemaking data developed by rate advisory organizations such as the Insurance Services Office, Inc.
information on prospective loss costs that is provided by advisory organizations can enhance competition by reducing the cost of underwriting, facilitating entry by insurers into new markets, and producing more accurate forecasts of future claim costs. Charges that the antitrust exemption promotes excessive profits, or, more generally, that the industry is not competitive, are also reflected by the evidence on industry-wide profitability and by-line profitability in automobile and workers compensation insurance. The absence of supra-competitive profits is consistent with the existence of vigorous competition. To be sure, the antitrust exemption presently is subject to considerable controversy. It is fundamental, however, that rate-of-return regulation would not be appropriate even if it could be shown that some change in the current limited antitrust exemption were desirable. 21

**Competition and Operating Efficiency**  In a market economy, the goal of higher profits provides firms with substantial incentive to minimize the total cost of production. Competition operates to reduce prices to the minimum level required to cover these costs. Due to competition, insurers generally will have substantial incentive to minimize the sum of claim payments and claim settlement expenses and to minimize the cost of product distribution that is needed to provide a given level of service.

Some observers who dispute these conclusions and argue for close regulatory supervision and control of expense levels commonly point to variation in the ratio of insurer operating expenses to premium across companies as evidence of inefficiency and allege that the industry-wide expense ratio is excessive. But these critics fail to recognize that a significant portion of auto insurer operating expenses are for the cost of defending and settling liability insurance claims. These costs would be paid directly by policyholders in the


22. See, for example, **Federal-State Regulation of the Pricing and Marketing of Insurance**, Note 15 supra.
absence of insurance coverage. Variation in expense ratios among insurers reflects differences in product mix, customer base, and levels of services. Those who imply that most insurance could be sold using methods that produce the lowest expense ratio, such as distribution through the mail, fail to recognize the role played by insurance agents in a competitive market, or to explain why mail order insurers with low expense ratios have not expanded to capture a major share of the market.

In a competitive market, firms that choose inefficient operating methods are not rewarded and eventually disappear. Since firms that introduce cost saving innovations can earn large profits until they are adopted by competitors, a substantial incentive exists for firms to adopt such innovations. The argument that the insurance industry is highly inefficient presumes an absence of competition. If a large part of the market could be served at lower cost, given the immense profit potential and the relatively low barriers to entry, why does some company not do so? Why do most consumers not flock to the insurers with low expense ratios if by doing so they could pay less without any reduction in service?

To be sure, some inefficient insurers might survive if consumers find it difficult to identify low cost insurers. Whether this is an important problem in the auto insurance market has been disputed. However, even acknowledging the costs of search, it seems implausible that a high degree of inefficiency could result. Moreover, to the extent that comparison shopping is difficult enough to justify action by the government, the preferred mode of regulation would be increased information disclosure rather than regulation or restrictions of insurer expense levels.

The Unpersuasive ‘Vital Need’ Argument In recent years it also has been argued that because some insurance lines, particularly

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24. For a general discussion of why information disclosure is preferable to price regulation under these conditions, see, STEFEN Breyer, REGULATION AND ITS REFORM 161 (1982).
personal automobile and workers compensation insurance are vital—and, in many cases, statutorily mandated—products, they ought to be subject to the same restrictions imposed on other vital services, such as utilities. Indeed, the argument has been made that precisely because these coverages are necessary in modern life and business activity, firms selling them should be expected to accept a lower level of profitability than might be expected in other industries.

This latter line of reasoning reflects a fundamental misunderstanding of economics and of the rationale behind public utility regulation. The reason that utilities are subject to rate-of-return regulation is not simply because the service involved meets a critical need. Numerous products—food, housing, and even automobiles—are at least as necessary as auto insurance, but the industries providing these products are not governed by restrictions on profitability. As a general proposition, it is a central tenet of mainstream economics that competitive pricing produces the lowest prices and widest range of service alternatives for consumers and serves as the most effective mechanism for producing adequate but not excessive profits. Adequate returns are defined not in terms of some subjective notion of fairness, but in economic terms, the return necessary to attract investment capital into the business.

Utilities receive distinctive treatment not primarily because of the social value of the service involved, but because utilities generally are natural monopolies. The existence of relatively low levels of concentration, low barriers to entry, and product and service diversity demonstrates conclusively that insurance does not remotely resemble a natural monopoly.

It is unfortunate that insurance products that fill vital needs have been afflicted by serious affordability problems, and, indeed, it is clear that these affordability problems have given impetus to both rate suppression and rate-of-return regulation. But the real cause of the affordability problem is high and increasing claim costs in automobile insurance and workers compensation, not lack of competition. Rate-of-return regulation is not an appropriate response to increases in prices that reflect increases in costs of producing goods and services.25

25. It also should be noted that research on the causes of affordability and availability problems in the commercial liability insurance market in the mid-1990s suggests that dramatic premium increases were largely the result of large unanticipated...
The Future Course of Rate Regulation: The unintended effects of rate suppression and the generic economic policy arguments against price controls raise a basic question: Is the regulation of property and casualty insurance rates in the public interest? We would suggest that while the realistic prospects for broad deregulation over the short-term may be limited, the question warrants serious consideration. Even in the absence of rate suppression, rate regulation carries hidden costs. There are administrative costs for regulators and insurers, and except under the most pro-competitive regulatory regimes, there is the cost of regulatory lag (i.e., delay). And, even prudent rate regulation will occasionally produce mismatches between rates and insurer costs, which in turn create market dislocations. Neither regulators nor insurers will ever have perfect information as to the future costs which determine today's rates. But marketplace participants will have more refined information than regulators about the forces that will influence future costs. And to the extent insurers' judgments about expected costs prove wrong, the less intrusive the role of rate regulation is, the greater the capacity to adjust quickly to changed conditions. The problems described above are most severe in prior approval ratemaking systems, which require the greatest level of regulatory resources and regulatory acumen to assure that prices match changes in expected costs. The inherent problems are least severe for the various forms of competitive rating systems, which allow greater market spontaneity and minimize regulatory lag.

Then, of course, there is the troublesome issue of overt rate suppression. Theoretically, there is nothing inherent in rate regulation...
that produces conscious rate suppression, and arguably the perversity of rate regulation in some jurisdictions should not undermine the case for rate regulation per se. Empirically, however, the 1980s experience suggests that in places where claim-costs are surging, there are powerful incentives to convert rate regulatory mechanisms into tools of rate suppression. There are individual states and regulators who have resisted that impulse, but the overall record has not been encouraging. If history shows that under certain conditions rate control systems serve as an invitation to abuse, that is at least a consideration militating against rate regulation.

The most powerful counter-argument favoring rate regulation is not, as might be supposed, that insurers will impose excessive rates in a free-market pricing environment. Competitive market structures will preclude excessive rates and profits. Rather, the argument is that rate regulation is necessary to avoid inadequate rates.

The fear of destructive price competition and its implications for insurer solvency spawned the introduction of insurer rate regulation nearly a century ago. We would not question that inadequate pricing has been and will continue to be a threat to the solvency of some insurers. Indeed, as a greater share of the total property and casualty insurance business shifts to the long-tailed commercial lines, pricing arguably will become more problematic, and the risk of substantial rate and reserve inadequacy may grow. What is unclear is whether rate regulation is a necessary or effective means of averting the solvency effects of inadequate rates.

History does indicate that from time to time some insurers will charge rates that by any reasonable standard should have been recognized as inadequate when the policy was written. The issue is whether rate regulation is an effective means of controlling the periodic inclination of some insurers to underprice their product.

There are at least two reasons to question the efficacy of rate regulation as an instrument to assure rate adequacy. First, most regulators have historically been reluctant to compel insurers to charge higher rates than insurers claim are necessary. Several states enacted “flex-rating” systems in the mid-1980s. These systems were designed in part to control underpricing in soft market periods, and

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65. Under flex-rating systems, insurers are allowed to modify their rates within some fixed “band” without prior approval. Rate changes above or below some specified percentage require prior approval.
Actuarial Principles and the Politics of Rate-making

experience may show some success in that effort. But for reasons that are readily understandable, publicly accountable regulators have generally been reluctant to force insurers to charge higher rates than market circumstances dictated.

The second problem is that assuming regulators have the will to enforce minimally adequate rates, insurers committed to reducing rates can circumvent minimum rate requirements. Within any given class of insurance, individual insureds will vary greatly in the risks that they represent. Unless regulators choose to micro-manage the entire pricing process, insurers can evade rate restrictions by selecting high-risk insureds and reclassifying risks. Even if rates and reclassifications are closely monitored and controlled, insurers so inclined can still build market share (and "achieve" inadequate rates) by raising commissions to agents and brokers or by providing increased services to policyholders. Theoretically, any one of those actions by companies could be prevented by tighter regulation, but more intensive regulation means higher regulatory costs, more delay, and a greater risk of the unanticipated consequences that flow from tight price control systems.

Assuming price controls could be effectively administered and carried no unintended consequences, the critical point is that rate regulation is unnecessary to effective solvency regulation. Among highly regulated financial institutions, the solvency threat posed by rate inadequacy is not unique to insurance. Like insurers, banks must make subjective judgments about future costs (i.e., credit risk) when the product is priced initially, and some banks will err in those judgments. As with insurers, periodic structural excess capacity products bouts of widespread underpricing. But in the wake of the most severe banking strains and the most extensive reconsideration of the scope and structure of regulatory policy since the 1930s, there has been no serious suggestion that regulators control the rates banks charge for their products. In the 1970s, certain classes of bank lending were subject to usury ceilings in some states, but the effects of such ceilings on consumer availability and bank balance sheets were so disastrous that a federal preemption was enacted in 1980. Since then, the notion of rate regulation of bank credit products has not resurfaced. The problems with such regulation would not be dissimilar from those that arise in the insurance regulatory context. There is a universally accepted recognition that such a regulatory regime would distort credit flows, produce availability problems, and reduce
marketplace efficiency. Moreover, policymakers and other analysts recognize that absent tight monitoring of every risk element in the pricing equation, banks could circumvent the effects of broad price regulations. Finally, in banking as in insurance, regulators have other tools that, properly applied, can address the solvency risks that stem from inadequate rates.

To be sure, monitoring the adequacy of pricing is a significant element in the regulator’s supervisory role. But if rate inadequacy threatens to impair an institution’s solvency—whether in insurance or banking—the regulator has an array of weapons available. First and foremost, the regulator can require increased reserves against future losses, the critical solvency issue is not so much whether business is written at high enough rates, but whether insurance policies (or bank loans) are backed by adequate reserves against future losses. The regulator can also require more capital, prohibit firms from writing new business, curtail dividends, and if necessary, take more drastic action against management. In short, regulators are well-equipped to control the risks stemming from inadequate rates without resorting to price controls.

In both insurance and banking, there has been a historic tendency to engage in regulatory forbearance, deferring firm action against weak companies. Although there have been instances where forbearance policies have been successful, the predominant result has been larger and more costly failures. But where regulators failed to control high-risk behavior, it is because regulators failed to perceive the risk or lacked the will to act. No set of rules will ever cure the fallibility of regulators—or marketplace participants—in assessing risk and predicting future loss costs. The problem is not the absence of regulatory power once that risk is perceived. Over the long term, economic realities drive public policy. Current trends in rate regulation are having corrosive effects on insurance markets, and eventually those effects will force reconsideration of the existing rate regulatory regime. In the interim, a more modest hope is that neutral observers without a vested interest in the more restrictive price control systems will take cognizance of the lessons that have been learned. Where choices among rate regulatory systems are to be made, arrangements giving the greatest weight to competitive pricing will produce the least marketplace dislocation. But the nominal statutory form governing rate regulation will not always be dispo-
sitite; competitive or flex-rating systems can become vehicles for rate suppression, and prior approval systems can be administered to provide adequate rates. The litmus test is whether insurers are allowed to charge actuarially sound rates with minimum levels of cost and regulatory delay.
Regulation and Reality †

Robert W. Klein *

Abstract

The author challenges JIR articles that have claimed that overly restrictive rate regulation (termed "rate suppression") in private passenger automobile and workers' compensation lines of insurance have led to a multitude of marketplace problems and increased the likelihood of insurer insolvency. He argues that estimates of the incidence and cost of rate suppression are based on a flawed methodology and that available data do not support such sweeping claims. The author acknowledges that rate regulation may have an adverse impact in certain jurisdictions, but suggests that rising costs and competition among insurers may also be contributing to insurers' operating losses. He concludes that the best strategy to address market problems is to reduce costs and relieve political pressure on the regulatory mechanism.

Introduction

Rate suppression is the latest buzzword to enter the insurance lexicon. Several contributors to this and other journals, along with insurance industry executives, have criticized what they perceive to be overly restrictive rate regulation in private passenger automobile

† The views expressed here are not necessarily those of the National Association of Insurance Commissioners.
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and workers’ compensation insurance. Regulatory critics contend that escalating claim costs have caused insurance regulators to suppress rates below adequate levels in order to minimize consumer discontent. Politically motivated rate suppression is blamed for a host of market ills, including substantial operating losses, market withdrawals, declining availability, diminished quality of service, decreased incentives for safety and cost containment, and increased insolvencies.

Othin Kramer’s recent study of rate suppression has garnered particular attention because of his attempt to quantify the effects of rate suppression in terms of insurer operating losses and their impact on insurers’ financial condition. Kramer argues that rate suppression is a pervasive problem that has caused insurers to lose approximately $9.6 billion in private passenger auto insurance and workers’ compensation insurance during the period 1987–89. A number of industry representatives and observers have used Kramer’s study to support allegations of widespread irresponsibility on the part of state insurance regulators and to argue that the federal government should preempt rate and market regulation by the states.

Few disagree that there are serious problems in the private passenger auto and workers’ compensation markets. Nor can it be disputed that the rate regulatory process is subject to significant political pressures, particularly in jurisdictions where costs and rates are increasing rapidly. However, the picture painted by regulatory critics is oversimplified and incomplete. The forces that affect market conditions in auto and workers’ compensation insurance are multifaceted, and insurers’ poor results cannot be blamed solely on rate regulation; nor can the problems be solved by deregulation or rubber


stamping rate filings. Further, the methodology used by Kramer to quantify the negative effects of regulation is significantly flawed and does not provide credible support for his conclusion that rate suppression is a pervasive problem that threatens the stability of these markets.

This article's objective is to point out the flaws in Kramer's quantitative analysis and broaden the discussion of rate regulation and its impact in the auto and workers' compensation insurance markets. Several economic, institutional, and political aspects of rate regulation are identified that are important for understanding rate regulatory policy. The impact of non-regulatory factors on market performance and their possible contribution to operating losses are discussed. Any efforts to achieve meaningful improvement in market conditions in auto and workers' compensation must recognize certain political realities as well as underlying economic forces.

Market Conditions in Auto and Workers' Compensation Insurance

Economists examine various aspects of insurance market performance, including prices, profits, operating efficiency, availability of coverage, quality of services, growth, and innovation. Under conditions of workable competition, we would expect the long-run equilibrium outcome of the market to possess the following properties:

1. The incremental or marginal cost of producing the last unit of output will be equal to the price that consumers are willing to pay for it.

2. There will be no "economic" profits. Investors will receive a return just sufficient to induce them to maintain their investment at the level required to produce the industry's equilibrium output efficiently.

3. Each firm will be producing at an output level where its average cost will be at a minimum.

Workable competition does not guarantee that insurance will be "affordable" for everyone, but it does ensure that consumers will not have to pay any more than absolutely necessary to obtain protection.
against the risk of loss and receive the type of services that they demand.

From the perspective of insurance consumers, price is generally the most important factor and "high" prices or rapidly increasing prices for insurance are a matter of great concern. Relatively high insurance prices can be caused by many things, including high loss costs, high expenses, consumer preferences, regulation, and lack of competition.

Profits are the most important measure of market conditions from the insurer perspective. If profits exceed insurers' cost of capital, then insurers will be induced to reduce their output and possibly withdraw from the market. Consequently, sustained operating losses or an inadequate rate-of-return portend problems for the availability of coverage and quality of service, adversely affecting consumers.

Unfortunately, market conditions in private passenger auto and workers' compensation are bad from every perspective. Rates are soaring while profits have plummeted. The price of auto insurance has climbed 41.9 per cent since 1986 compared to only 24.3 per cent increase in the overall cost of living. The average workers' compensation premium nationwide has increased from $1.99 per $100 of payroll in 1986 to $2.27 in 1989. No wonder consumers and employers are up in arms!

However, high auto and workers' compensation insurance prices cannot be attributed to high profits. NAIC figures indicate that insurers made $1.7 billion in operating profits (excluding investment income on surplus) on personal auto insurance in 1990, which is roughly two per cent of premiums earned (see Figure 1). Operating results are considerably improved from 1980 when insurers lost $2.1 billion. Still, total rates-of-return in personal auto have historically been below rates of return in other industries (Figure 2). According to NAIC estimates, the total rate-of-return (including investment income attributable to surplus) for private passenger auto in 1990 was 5.7 per cent compared to 13.0 per cent for the Fortune 500 companies. The improved 1991 results are attributed largely to a decline in the frequency of auto accidents caused by the recession. Premiums increased by 6.6 per cent in 1991 but losses actually decreased by 1.7 per cent.

The situation is worse in workers' compensation. Insurers lost $2.5 billion (excluding investment income on surplus) on workers' compensation business alone in 1991, which represents seven per
FIGURE 2
Workers' Compensation and Private Passenger Auto Comparative Rates-of-Return* — 1985-1990

* on GAAP net worth
Source: Insurance Information Institute and National Association of Insurance Commissioners
cent of premiums earned (Figure 3). Losses are up from 1990 but most of this increase appears to be due to reserve adjustments for losses incurred in prior years. In other words, conditions were bad in 1991 but not necessarily that much worse than in previous years. Correspondingly, total rates-of-return in workers' compensation have been much lower than profits in other industries. According to NAIC estimates, the total rate-of-return for workers' compensation in 1990 was 4.8 per cent.

The residual market also is a very serious problem in workers' compensation. It represents 26 per cent of the total market and has been growing rapidly and losing money (Figure 4). According to National Council on Compensation Insurance ("NCII") estimates, operating losses for NCII-administered pools alone (excluding Maine) were $2.2 billion for policy-year 1991, which represents 17 per cent of voluntary market premiums. The assessment of these losses back to the voluntary market induces insurers to curtail their writings, which further expands the residual market.

It is important to note, however, that market conditions vary significantly among states. According to NAIC data, in 1991, state loss ratios for private passenger auto varied from 57 per cent in Maine to 84.1 per cent in Kansas. State loss ratios for workers' compensation varied from 62.9 per cent in Alaska to 282 per cent in North Dakota, which has a monopolistic state fund. The residual market share for workers' compensation in 1990 varied from 3.1 per cent in Arizona to 87.1 per cent in Maine. Market conditions are also worsening in some states and improving in others. These markets are not monolithic by any means. The differences among states may provide some insights on the causes of the averse conditions in those markets and what might be done to improve conditions.

**Methodological Flaws in Kramer Study**

Kramer and others blame rate regulation for the poor results in auto and workers' compensation. To evaluate the Kramer study and respond generally to allegations of rate suppression, it is necessary to define rate suppression. Analysts have defined the term variously. In

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FIGURE 3

Source: A.M. Best and National Association of Insurance Commissioners
FIGURE 4

* NCCI Administered Pools Only
** Excludes New Mexico
Source: National Council on Compensation Insurance
his article, Kramer states that "when the regulatory action that holds rates below the level implied by expected loss costs becomes particularly intensive, we call that phenomenon 'rate suppression.'" However, in his original report, Kramer states that "rate suppression occurs whenever premium rates are held below levels that would exist in a competitive market." Harrington, alternatively, defines rate suppression as a "reduction of total premiums . . . below the level that would exist without price regulation." Theoretically, Kramer's second definition is preferable if we believe that regulators should seek to approximate the market outcome that would be achieved under perfect competition. Even holding rates marginally below competitive levels can cause market dislocations in the long run. At the same time, rates may exceed competitive levels in a market, absent regulation. For purposes of this discussion, the author will characterize regulatory rate suppression as the practice of holding rates or premiums, in the aggregate, below competitive levels.

Kramer characterizes states as rate suppression jurisdictions if they meet two of the following three criteria: 1) a residual market in 1989 that represented at least 10 per cent of the total market for private passenger auto or 20 per cent of the total market for workers' compensation; 2) average negative operating income over the 1987–89 period for private passenger auto or workers' compensation, and 3) a history of disapprovals of rate requests by the major rating bureaus over the 1987–89 period. Using this method, Kramer identified 11 states as rate suppression jurisdictions for private passenger auto and 25 states as rate suppression jurisdictions for workers' compensation.

To estimate the loss in revenue and earnings, Kramer assumed that the lost revenue was the amount necessary to equalize operating ratios between the rate suppression and non-rate suppression states. Kramer acknowledges that this methodology may underestimate the incidence and cost of rate suppression in some states and overstate the incidence and cost of rate suppression in other states. He points out that there may be individual states that engage in rate suppression where operating results are poor but not negative, to the extent that those states are classified as non-rate suppression jurisdictions, the

incidence and cost of rate suppression will be understated. Conversely, he notes that to the extent that there are states where operating income is negative for reasons independent of rate regulation, in them the incidence of rate suppression may be overstated.

Kramer believes that, on the whole, these effects offset each other when the state results are averaged together. He states:

To the degree that circumstances peculiar to a particular jurisdiction—but unrelated to rate suppression—pushed operating income up or down, those anomalies are likely to cancel each other out when the state results are averaged together. In other words, the states where insurers lost money for reasons independent of the ratemaking process are likely to have been roughly offset by the states where favorable conditions masked the impact of rate suppression. In short, the limitations described above should not impair the credibility of the overall findings regarding the nationwide costs of rate suppression. But because there is simply no way to determine with precision the level of profitability that would have existed in a given jurisdiction in the absence of rate suppression, the findings regarding individual states—both with respect to the presence or absence of rate suppression and the estimated dollar cost of rate suppression—should be treated with caution. [Emphasis added.]

However, the problems with Kramer's methodology are much more serious than he acknowledges. These methodological flaws undermine significantly the credibility of Kramer's estimates of the incidence and cost of rate suppression. A significant flaw is that the study uses negative operating losses both to classify states as rate suppressors and as a measure of the cost of rate suppression. This biases the analysis towards concluding that rate suppression causes operating losses. Kramer acknowledges this bias but contends that it is mitigated by using three-year average income as a test [which reduces the risk that some other factor—e.g., a natural catastrophe—had caused operating losses] and requiring that states meet at least one other criterion to be characterized as a rate suppression jurisdiction. He further notes that two-thirds of the states deemed as rate suppression jurisdictions met all three criteria, i.e., the presence or

The absence of operating losses was not critical to the selection process in the majority of instances.

The concern about selection bias is not alleviated by these mitigating factors. A substantial bias could remain that causes Kramer's analysis, in this respect, to overestimate the incidence and cost of rate suppression. The use of the same variable to identify rate suppression jurisdictions and measure the effect of rate suppression is inappropriate.

This concern is reinforced by the fact that one of the states that Kramer identified as a rate suppressor for workers' compensation—Kentucky—has "a use and file" system and the advisory organization files loss costs. Insurers are not required to adhere to advisory rates or loss costs in Kentucky. At the very least, the identification in the study of Kentucky as a rate suppression jurisdiction would seem to warrant discussion.

Kramer's identification of Oregon as a rate suppressor for workers' compensation also seems incongruous. Oregon had a "file and use" and loss cost system from 1982–1987. Because of aggressive competition and adverse financial results, Oregon reinstituted prior approval in 1988 to impose discipline in the market. This move, coupled with cost containment reforms, have improved significantly the financial results for the Oregon workers' compensation insurance market. It is incorrect to assume that rate regulation suppressed rates in Oregon when it has done the opposite.

The bias involved with using operating results to identify rate suppression states also affects Kramer's finding that regulatory rate suppression is more likely in jurisdictions experiencing significant cost pressures. Kramer asserts that, "Empirically . . . the 1980s experience suggests that in places where claim costs are surging, there are powerful incentives to convert rate regulatory mechanisms into tools of rate suppression." It is not surprising to find that cost increases outstrip rate increases when costs are escalating rapidly, causing profits to fail. Regulatory lag may contribute to this phenomenon in prior approval jurisdictions without any deliberate intention to suppress rates. It also is plausible that increased cost/price pressures will increase political pressure on the legislative and regulatory process to suppress rates. However, rapidly escalating costs may outstrip rates for reasons other than regulation. To the extent that Kramer uses negative operating results as a criterion for iden-
tifying rate suppression states, he creates a bias towards finding that cost pressures are associated with rate suppression.

There are also problems with using rate filing disapprovals and the residual market share as indicators of regulatory rate suppression, although they are less problematic criteria than operating results. Most states approve smaller rate increases than those filed by the NCCI, the major rating bureau for workers' compensation, so virtually all prior approval states meet this criterion for workers' compensation. Kramer discounts the possibility that advisory/rating organizations will file requests for more than what is needed on the basis of "a review of NCCI and other rating bureau data." He does not elaborate on what this review consisted of but states typically reject NCCI filings for a number of technical reasons. This is not to say that NCCI rate indications are always excessive, only that state regulators have not found NCCI rate indications to be supported by the information contained in the NCCI filings. Consequently, simple disapproval of rate filings for workers' compensation may not be a good discriminator between rate suppression and non-rate suppression states for workers' compensation.

Kramer's use of the residual market share to identify rate suppression states also is problematic in that the residual market share can be affected by factors other than rate regulation. A number of factors can increase residual market applications, including adverse financial results due to non-regulatory factors, tighter underwriting criteria, rigidities in the pricing structure, demographic, and economic changes, etc., which may or may not be associated with regulation. Also, if residual market rates are held below costs it does not necessarily mean that rates are suppressed on the whole if voluntary market rates are adjusted appropriately to make up any shortfall in the residual market.

Another major problem with Kramer's study is that it attributes all of the difference between a rate suppression state's operating results and the average results for non-rate suppression states to rate suppression when other factors could explain all or a portion of that difference. The fact is that insurers' underestimation of cost increases and/or competition could account for all or a portion of sub-par operating results in a state, such as in Oregon. Underpricing is a

9. Id.
chronic problem in long-tail commercial liability lines even when rates are not closely regulated. The potential effects of non-regulatory factors are discussed below.

Kramer contends that these biases are balanced by other factors when states' results are averaged together. The author agrees that there are countervailing factors, but the basis for assuming that these biases cancel out is not apparent. The effect of regulation on a nationwide basis could be much greater or much less than Kramer's analysis indicates. Thus, Kramer's estimates of the incidence and cost of rate suppression on a nationwide basis are not credible.

Similar concerns extend to Kramer's analysis of the association between rate suppression and solvency. It is not surprising that financially weak or insolvent companies have written a disproportionately larger share of their business in less profitable markets, but this does not mean that rate regulation contributed to their poor financial performance. Other factors that adversely affect operating results in those markets could have contributed to the poor performance of these companies. Consequently, the study does not establish a sufficient basis for concluding that regulatory rate suppression has had a significant impact on insurers' financial condition or has been a significant factor in insolvencies.

In sum, Kramer's findings with respect to the widespread incidence and substantial cost of rate suppression are not adequately supported by his analysis. Although it is fairly obvious that government has had a significant impact in the auto insurance market in a state like New Jersey and in the workers' compensation insurance market in a state like Maine, widespread and severe market effects due to regulations have yet to be demonstrated. Unfortunately, Kramer's study has been used and misused by many to condemn state insurance regulation as the primary cause of the problems in the auto and workers' compensation insurance markets.

The difficulties inherent in estimating the effects of regulation on insurance markets is readily acknowledged. To date, the author's research suggests that rate regulation has only lowered profits marginally in auto insurance markets, somewhat more so in states with more stringent regulatory policies than in states with less stringent policies.10 These results appear to be fairly consistent with other re-

search in this area. The literature is less conclusive with respect to whether regulation has suppressed rates below "competitive levels" or whether consumers have been aided or hurt by regulation.

It is important to conduct further research in this area because regulatory policies and market conditions change and we continue to refine our analytical methods. Currently NAIC staff are conducting studies of the automobile and workers' compensation insurance markets and are assessing the effects of regulation as well as a number of other factors on market performance. Various methods are being employed in these studies including econometric analysis, case studies, and interviews with regulators, advisory/rating organizations, and company executives. Though a variety of analytical techniques are useful in this kind of research, multivariate econometric and statistical methods are generally superior to the methods used by Kramer to measure the effects of regulation. However, even with more sophisticated methods, it is very difficult to quantify the effects of regulation in dollar terms on a state or national basis because of the multitude of variables that influence market performance. What is more feasible, perhaps, is to attempt to determine the direction of regulatory effects and, possibly, gain some understanding of the significance of regulation relative to other factors.

The Political Economy of Insurance Rate Regulation

Certain principles must govern rate regulatory policy. State rate regulatory laws uniformly require that rates not be excessive, inadequate, or unfairly discriminatory. This means that rates must cover the cost of providing coverage, including the cost of capital committed by insurers. In the long run, consumers will be hurt by government policies that seek to hold insurance prices below competitive levels. Insurance regulators generally understand and seek to adhere to these principles as best they can in a political environment.

Before we can undertake a realistic assessment of rate regulatory policy, it is necessary to understand several things about the regulatory process. First, some states regulate auto and workers' compensation rates more closely than others, and insurers can retain substantial flexibility in setting rates even under prior approval regulatory systems. Second, a number of methodological issues arise in assessing the reasonableness of rates filed by an advisory/rating organization or an insurer. The fact that a regulator disapproves a rate filing does not automatically constitute rate suppression as defined here. Third, if they are to be effective, insurance regulators must be sensitive to the political environment in which they operate and the impact of rate regulatory decisions on various groups. However, the specific interpretation and application of these principles varies among the states.

Approximately half of the states use competitive rating systems (i.e. file and use approval, use and file approval) for private passenger auto insurance. States have been slower to move away from "administrated pricing" or prior approval systems in workers' compensation. Currently, 10 states have file and use or use and file systems for workers' compensation. Under a true competitive rating system, rates are essentially determined by market forces rather than by regulators. Some states may nominally have a competitive rating law but administer it as a prior approval system or effectively control rates through other means. Some states also have adopted flex rating systems in which insurers are allowed to file for rate increases or decreases within a certain range without prior approval.

The filings by advisory/rating organizations receive the greatest attention because they serve as a reference point for individual insurer filings. Historically, advisory/rating organizations have filed final rates or loss costs that exclude profit and expense provisions. Generally, rates are filed on an advisory basis. In effect, the advisory rates provide a general benchmark for insurers' pricing. They are intended to yield a reasonable profit for the market as a whole. Insurers can choose either to accept the advisory rate, file a deviation from it, or file their own rates. Mandatory uniform rates, with limited or no allowance of deviations, are still the practice in workers' compensation for some states, but this approach has declined over time in favor of advisory rate systems.

Under a loss cost system, insurers must file their final rates (which can be a combination of the advisory loss costs and the in-
suites' expense and profit factors. Alternatively, insurers may base their rates on their loss costs or the advisory loss costs modified by a factor. For private passenger auto, before 1991, advisory rates were typically filed in prior approval states and advisory loss costs were filed in competitive rating states. In 1991, following an NAIC recommendation, virtually all states moved to a loss cost system for private passenger auto insurance. Loss cost systems have been less common in workers' compensation. Currently, 15 states use this approach. The NAIC has recommended that all states move to a loss cost system for workers' compensation by 1994.

Most states allow insurers a considerable amount of downward flexibility in pricing for auto and workers' compensation. As mentioned above, in all but a few states, insurers may depart from advisory rates, typically downward. Insurers also can make other competitive pricing adjustments in determining the price paid by insureds. They may also file higher rates than the advisory rates, but this rarely happens. Consequently, the advisory rates that are filed and approved tend to serve as a ceiling on the rates used by insurers before competitive pricing adjustments. Though insurers may have limited flexibility in setting rates higher than the advisory rates, they have considerable flexibility in setting lower rates, which creates the potential for underpricing.

Loss cost systems potentially offer insurers greater pricing flexibility, even under prior approval requirements. If the advisory loss costs approved by regulators are perceived to be too low, insurers can file a multiplier that includes an appropriate adjustment for the perceived inadequacy. Some states may be willing to approve such modifications within reasonable limits. Because of the implementation of loss cost systems and the continued interest in competitive rating, prospects are good that market forces rather than regulation will become a greater determinant of insurance prices if the insurer can provide appropriate support. Instituting more restrictive public utility style rate regulatory systems will likely remain isolated.

This is just as well, because insurance pricing is inherently a speculative enterprise and reasonable minds can differ over what are expected costs and what is an adequate rate. The rates and rating rules filed by advisory/rating organizations are based on extensive analysis of a large amount of data. Historical data on losses, expenses, and premiums are developed to a current basis and then projected forward to the period in which the filed rates will be in effect.
This projection considers the effect of medical cost and indemnity trends, law changes, payroll trends, investment income, and other factors. If projected costs, including a provision for a reasonable profit, exceed projected premiums, a rate increase is requested. If projected premiums exceed projected costs, a rate decrease is filed. The indicated rate change is then allocated to the various classifications according to relative experience of each.

Because of increasing costs in many states, advisory/rating organizations have more often filed rate increases than rate decreases. Filings for double digit rate increases are common in workers' compensation, in most instances, regulators have approved a rate increase smaller than that filed by the advisory/rating organization. Understandably, the NCCI has expressed grave concerns about the fact that less than half of its rate requests are being approved in many states. It contends that the full amount of the rate requests that it files is needed and the failure to grant the full amount results in rate inadequacy. Further, the NCCI and Kramer assert that regulatory decisions to grant less than the rate increases filed are politically motivated and ignore economic reality.

Clearly, rate regulatory decisions are not made in a political vacuum, and concerns about effects on employers and a state's economic climate are included in regulatory considerations. But regulators also may have substantive reasons for approving a rate change different from what is filed by the advisory/rating organization. Simons, Eley and Klein have outlined some of the areas where regulators have differed with NCCI ratemaking assumptions and methods. These areas include creditability, loss development, trend, expenses, investment income, profit factors, and provisions for dividends to policyholders. There are differences of opinion with respect to the specific formulas and assumptions used, the number of years of historical data included, and the extent to which calculations rely on state vs. countrywide experience. There can also be different expectations with respect to the cost effect of changes to the workers' compensation laws. Law changes have been a significant area of contention in certain states where there have been substantial efforts to

12. Fein, op. cit. Note 1 supra.
reform the workers' compensation system to lower costs. These differences in methodology and assumptions can lead regulators to believe that a different rate indication is appropriate for their particular state.

Another consideration arises with respect to the relation of advisory rates to market forces. Insurers vary in terms of underwriting standards, expense loads, investment practices, and competitive strategies. Also, expected costs are not totally exogenous. Insurers have some control over claim costs and expenses through claims adjustment, safety and loss prevention programs, pretax audit, fraud detection, back-to-work programs and their internal management. Regulators may be reluctant to set advisory rates high enough to allow all insurers, including inefficient ones, to make a reasonable profit.

A related question is whether the advisory rate formula should provide for dividends to policyholders. NCCI filings typically contain such a provision, which is based on historical dividend rates. However, some regulators do not allow such a provision because dividends are not guaranteed and are based on a carrier's actual experience—a practice consistent with that expressed in the NAIC's 1984 Investment Income Report.\(^\text{15}\)

This is not to argue that the regulators are always right and advisory/rating organizations are always wrong. Indeed, a recent examination of certain components of the NCCI's ratemaking methods including development, trend, and expenses concluded that its procedures are generally reasonable for those components.\(^\text{16}\) However, the examiners indicated that, to a certain extent, the appropriate methods or assumptions for rate analysis must be determined on a state-by-state basis. The examination also identified areas where the NCCI should improve its procedures or undertake further analysis. The examiners noted that the supporting information and analysis in NCCI filings should be enhanced. Further, the examination did not address the reasonableness of NCCI methods with respect to investment income, profit factors, and dividends to policyholders.

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which have been a major source of regulatory differences with NCCI filings.

Unfortunately, complex and highly technical rate regulatory decisions sometimes must be made in a politically charged environment where various groups have significant economic interests at stake. Auto insurance for one vehicle can cost several thousand dollars in some cities. Workers' compensation also can be quite expensive for employers involved in high-risk occupations and high-cost states. Consequently, workers' compensation rates can have significant implications for a state's economic climate and its ability to compete nationally and internationally for jobs. Groups that have a considerable economic stake in rate regulatory decisions exert substantial political pressure on the process.

This political pressure tends to increase the burden of proof that is placed on the advisory/rating organization to support its filing. The decision to disapprove a requested rate increase does not necessarily mean that it is incorrect, only that it is not sufficiently supported by the information contained in the filing. Rightly or wrongly, the burden of proof that is imposed tends to increase commensurately with the amount of the requested increase. The advisory/rating organization must make a stronger case for a 30 per cent increase than a five per cent increase if the commissioner is to be able to withstand the political pressures exerted by constituencies adversely affected by such an increase. Many regulators believe that the NCCI has fallen short in providing the necessary data and analysis to support the full amount of its rate requests.

It is also important to point out that government involvement with auto and workers' compensation insurance rates extends considerably beyond the insurance commissioner in some states. Historically, legislatures have confined their involvement to setting the statutory parameters for rate regulation, but in recent years they have become directly involved in setting insurance rates. This concept was taken a step further with California's Proposition 103 when the voters, by referendum, determined that rates should be reduced by 20 per cent. Legislators also may seek to influence regulatory decisions through more informal means, exacting leverage through the appropriation process or threatening to withhold passage of insurance legislation. Governors also have actively intervened in workers' compensation rate regulatory decisions because of concerns about the economic effect of rate increases. Some states with
severe market problems have a history of significant legislative involvement with insurance pricing.

Direct legislative or voter involvement in rate regulatory decisions represents a quantum leap in politicizing such decisions. Rate rollbacks or limits on rate increases are sometimes necessary to achieve political support for cost containment legislation. However, even in those instances, the expected cost savings from legislative reforms may not equal the magnitude of the rate reduction or limitation contained in the legislation. When the venue for rate regulatory decisions is moved from the insurance department to the legislature, technical issues become secondary to the struggle between different political and economic interests.

Politicians may ignore temporarily economic realities, but in the long run they (or at least their successors) must face the negative effects of forcing rates below costs. Actions by insurers to curtail their writings in the voluntary market or simply withdraw from a market ultimately imposes some discipline on political and regulatory decisions. If insurers are not allowed to withdraw from a market, rate suppression, if sufficiently severe, will result in insolvency. However, several factors can delay insurers’ exit from a market.

In the short run, insurers will still be induced to write policies if they can at least recover their variable costs. Consequently, if there is a reasonable chance that rates may eventually rise to adequate levels and/or substantial legislative reforms may be enacted that will lower costs, insurers may be reluctant to abandon a market and their substantial sunk investment. Indeed, the potential gains from such a strategy could increase as other insurers withdraw from the market. Harrington theorizes that regulators can appropriate the value of insurers’ sunk investments through rate suppression strategies.17

Insurers also may delay exit from a market to the extent that they benefit from “economies of scope” in packaging workers’ compensation with other commercial coverages and servicing national accounts operating in a number of states. This does not mean that insurers can raise rates in other lines or in other states to offset losses in a given market. Competition at these other markets should prevent them from doing so. However, gains to multi-state and multi-

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line operations may serve to deter up to a point exit from a given market. Also, profits earned in other markets could help to sustain an insurer that elects to hold out for improved conditions in a market where rates are inadequate.

States also have imposed various limitations on insurers' ability to exit from a market, including "lock-in" provisions (primarily confined to personal auto insurance) that require insurers to exit all lines in a state in order to exit a given line, thus increasing the stakes for an insurer who contemplates such an exit. Harrington points out that these provisions force insurers to forfeit the value of sunk investments made in other lines of business.\(^{18}\)

These factors may delay insurers' withdrawal but cannot prevent it. Ultimately, insurers will pull out of a state if their losses become severe enough and the prospects for legislative reforms and/or rate relief are dim. Unfortunately, by that point the state may have a crisis situation on its hands with much more drastic action required to restore availability of coverage.

The prospects for instilling greater rationality in the political environment for workers' compensation are almost as daunting as resolving the federal budget deficit. The complexity of the issues in workers' compensation and the fact that the consequences of policy decisions are not always immediately apparent contribute to political self-delusion. However, reality ultimately rears its ugly head and policymakers are forced to deal with the economic implications of rising costs and inadequate rates. The question is how far does the market have to deteriorate before politicians are moved to take action. A state's propensity to enact workers' compensation reforms presumably is based on a number of factors, many of which are not subject to being changed by those who are concerned about the market. Still, any efforts to improve conditions in the workers' compensation market in a state must address the primary political institutions that affect the market, not just the insurance commissioner's office. Education of politicians and their constituencies about the workers' compensation system and the likely effects of different policy options is one of the few tools available to promote more rational decision-making in this arena.

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\(^{18}\) Id.
Effects of Rising Costs and Competition

The fact that politics may affect rate regulatory decisions does not necessarily mean that rate suppression is the only or even the primary cause of market problems in auto and workers’ compensation insurance. Both rapidly escalating costs and aggressive price competition among insurers may be substantial contributors to the poor operating results in these lines. Costs have risen at a pace far exceeding normal inflation in both auto and workers’ compensation insurance. The pure premium (losses incurred divided by written car-years) for private passenger auto liability increased 43 per cent from 1967 to 1991, and the pure premium for comprehensive coverage increased 36.7 per cent over this same period. Workers’ compensation benefits as a percentage of payroll increased 30.6 per cent from 1984 to 1989. These high costs place tremendous pressure on the pricing mechanism. That cost surge, even in the absence of regulatory constraints, could exceed insurers’ expectations and the prices they would set. The situation in workers’ compensation today bears some unfortunate similarities to the situation in general liability insurance in the early 1980s when rates lagged behind rapidly rising costs.

Increases in workers’ compensation claim costs have outstripped NCCI and insurers’ rate indications in some states. Milliman & Robertson found that NCCI methods have tended to underestimate loss development by an average of 7-10 per cent and loss trend by eight per cent using a linear method and two per cent using an exponential method. Standard methods and assumptions may be inadequate for periods when costs are escalating rapidly because of a variety of economic and institutional factors.

Many of the causes of cost increases have to do with the structure of liability laws and the workers’ compensation system and exploitation by some medical providers and attorneys. But insurers and employers also bear some responsibility. In theory, insurers should optimize their expenditures on loss prevention and claims adjustment activities but anecdotal evidence suggests that this is not always the case. Insurers appear to vary significantly in terms of the

kinds of loss prevention services they provide and the quality of their claims adjustment processes. Many employers also do a poor job in providing a safe work environment and facilitating injured employees' return to work.

Poor incentives for cost control in workers' compensation residual markets may also contribute to escalating costs. Because residual market losses in most jurisdictions are reinsured totally through a pool, servicing carriers have no direct incentive to minimize losses beyond controls imposed by the residual market administrator and the portion of losses that the carrier bears through residual market assessments based on its voluntary market share. Indeed, because servicing carrier fees are fixed, there actually is a disincentive to provide other than minimal services to residual market policyholders to the extent that additional expenditures on service reduce servicing carrier profits. This incentive problem could be further fueling the rapid growth of the residual market and its burden on the voluntary market. In addition, the rapid growth of the residual market has undoubtedly taxed resources of servicing carriers which may have, at least in the short run, impaired their efficiency in servicing these risks.

Even in the absence of regulation, it becomes very difficult for insurance pricing mechanisms to keep pace with soaring costs. The problem is further compounded to the extent that escalating costs impose political pressure on the regulatory mechanism, which constrains insurers' ability to adjust prices to match costs. As Kramer and others have pointed out, the failure of the political system to reckon with increasing costs furthers exacerbates the problem and accelerates the deterioration of the market.

The rapid escalation of costs also increases the potential for underpricing by insurers. There is evidence of continued strong price competition despite operating losses among insurers in workers' compensation. As explained above, the workers' compensation rates filed by the NCCI and approved by regulators are manual rates that are filed in most states on an advisory basis. Insurers make a number of adjustments to manual rates to determine the premiums for particular insureds. Some of these adjustments are made for competitive reasons and include departures or deviations from advisory rates, schedule credits, dividends to policyholders, and deferred payment of premiums. Specific experience rating and retrospective rating programs may also be offered as a competitive device.
Competitive pricing adjustments have been substantial in workers' compensation. As indicated in Figure 5, competitive pricing adjustments have declined over the last several years but are still significant. For NCCI states, competitive pricing adjustments were reported to be 6.6 per cent of standard premiums earned for policy year 1990.

The effect of competitive pricing is reflected in the analysis of historical profits in workers' compensation discussed above. The estimated rate-of-return in 1990 excluding dividends is 9.3 per cent compared to the actual 4.8 per cent rate of return including dividends. Operating losses before taxes in 1990, excluding dividends as well as investment income on surplus, would be only $134 million or 0.4 per cent of premiums earned.

Why do significant competitive pricing adjustments continue when workers' compensation profits are inadequate? Part of the explanation lies in the fact that some insurers are doing better than others and that manual rate levels in some states allow insurers greater pricing flexibility. Insurers with better experience are in a position to pay higher dividends. States where advisory rates are higher in relation to costs allow insurers more room to make competitive pricing adjustments. Competitive pricing adjustments do tend to be lower in low-profit states although they are still quite significant even in those jurisdictions.

Competition may compel insurers to continue to make pricing adjustments for particular insureds even in the face of overall operating losses. The rating system for workers' compensation, as complex as it is, cannot account for all the variations among insurers and insureds and rate departures, schedule credits, dividends, and other adjustments allow insurers to further fine tune their pricing for a specific employer. In particular, insurers may be pressured to offer pricing concessions to employers who might otherwise self-insure.

An additional factor to consider is that some insurers may be willing to sustain short-run losses to position themselves competitively for long-run profits. This is more feasible for insurers earning adequate profits in other lines. In theory, if there are no barriers to entry or exit and competition is working perfectly, there should be no potential gains from such a strategy. However, while entry and exit barriers are not high for workers' compensation, they also are not trivial. As discussed above, there is a substantial investment
* Rate departures (downward); schedule rating and dividends as a percentage of standard earned premium for states serviced by NCCI
Source: National Council on Compensation Insurance
involved with writing workers' compensation which could provide some competitive advantage for insurers entrenched in a market. 20

Concerns about underpricing are not limited to workers' compensation. Harrington and Danzon have studied possible causes of inadequate prices in soft liability insurance markets. 21 Although the notion of "cash flow underwriting" has been challenged, Harrington and Danzon theorize that excessive price cutting may be associated with inexperience and excessive risk taking by some insurers. Also, the literature suggests that the unprecedented growth in liability claim costs considerably exceeded insurers' expectations and was a substantial factor behind the large underwriting losses and subsequent price increases during the mid-1980s. 22 Some of the same factors could be playing a role in the poor performance of the workers' compensation market.

Moreover, as explained above, workers' compensation is often packaged with other liability coverages. Similarly, many insurers market personal auto and homeowners coverage and offer discounts to insureds who purchase both coverages from the same carrier. Insurers may be willing to sustain lower profits on one coverage if they are offset by higher profits on other coverages. Again, this would seem to contradict the standard competitive model but there may be "economies of scope" or other advantages that arise in combining several coverages as a package. This suggests that it is not possible to analyze conditions in one line in isolation from insurers' other operations.

20. Insurers may be able to charge supracompetitive prices, under certain circumstances, if there are barriers to entry. Also, Cummins and Danzon hypothesize that insurers holding private information about favorable risks are able to raise prices above cost for those risks. If the policyholders go back into the market to seek insurance from an alternative company, much of the private information is lost. Policyholders with favorable risk characteristics may be charged a higher price in the open market because other carriers do not have as much information on their risk characteristics as their present insurers. Thus, they may be willing to sustain a price increase without switching. See Cummins & Danzon, Price Shocks and Capital Flows to Liability Insurance in Cummins, Harrington & Klein, eds., 75 Cycles and Cycles in Property/Casualty Insurance: Causes and Implications for Public Policy [1991].


The point of this discussion is not to argue that profits should be estimated by excluding dividends or other competitive pricing adjustments, or that insurers should or could discontinue competitive pricing. Rather, the point is that competition could have a significant effect on profitability. Understandably, it is not easy to distinguish the effects of regulatory factors from non-regulatory factors or to assess the extent to which insurers' may be underpricing auto and workers' compensation coverage if at all. Still, the available evidence suggests that market factors as well as regulatory factors deserve further scrutiny in analyzing the problems in these markets. Efforts to improve operating results by raising advisory rates may not prove to be fully successful if insurers respond by increasing competitive pricing adjustments.

Conclusions

Conditions in the auto and workers' compensation insurance markets are poor and deserve the focused attention of regulators and policymakers. However, the underlying causes are not as simple as regulatory critics suggest. Although regulation may have limited rate increases in some states, regulation alone cannot be blamed for these markets' poor performance. The sources of the problems are both institutional and economic. They include benefit and eligibility provisions, tort laws, litigation, accident rates, economic factors, medical cost trends, workplace safety, residual market mechanisms, and market forces.

To improve conditions in these markets it is necessary to study and understand all of these significant forces that affect them. Remedial measures must also be multifaceted. Simply increasing advisory rate levels alone will not fix the problems. In addition, any successful strategy must forge solutions that are politically feasible given the various interests that are affected by public policy.

Clearly, the effects of regulation on the marketplace and ways to improve the efficiency of rate regulatory systems should be explored. Competitive rating systems that place greater reliance on market forces may offer advantages in a number of states. Most economists

agree that the workers' compensation and private passenger auto insurance markets are structurally competitive. A number of states have successfully employed competitive rating systems for auto and workers' compensation and other states may wish to seriously consider competitive rating for these markets. Competitive rating offers the advantage of avoiding controverted rate hearings and depoliticizing rate setting, while allowing regulators to direct more resources to market conduct and solvency monitoring. Alternatively, prior approval systems may work well in some jurisdictions with appropriate resources and procedures and where the regulatory mechanism is not subject to significant cost pressures.

States should promote reasonable competition and greater efficiency in the market through improved consumer information and other means. Such efforts might include educational materials and seminars to teach individuals and businesses on how to shop for insurance. Repeal of anti-rebate laws and restrictions on the sale of group auto insurance could be studied. Uniform implementation of loss cost systems should encourage insurers to more closely evaluate their costs of operation and identify where greater efficiencies could be achieved.

Advisory organizations should continue their efforts to improve their data systems and the supporting analysis for their loss cost and rate filings. Improved actuarial procedures should be explored to better rate needs over future periods. Standard trend methods should be supplemented with economic and institutional analysis. The NCCI examination and the follow-up efforts should go a long way in improving understanding and consensus in the regulatory environment for workers' compensation rate filings.

Remedial efforts also should include other measures to improve economic incentives in insurance markets. Stricter solvency measures, including actuarial reserve opinions and risk-based capital requirements, should encourage insurers to engage in more sensible pricing. Guaranty fund coverage might be modified to provide insureds with greater incentives to purchase coverage from insurers that charge adequate rates. Also, improvements in residual market incentives, such as those being implemented by the NCCI at the urging of the NAIC, to control claim costs and their detrimental impact on the voluntary market might help to slow the rapid growth of operating losses.
Finally, it is difficult to contemplate any significant improvement in the auto and workers' compensation markets without system reform as well as greater cost containment efforts by insurers and employers. No private insurance mechanism is equipped to handle the rapidly escalating costs and cost shifts that are occurring in workers' compensation. Concurrently, insurers and employers need to increase their efforts to reduce accidents, manage claims efficiently and return injured workers back to productive employment. Innovations such as 24-hour coverage and large-deductible workers' compensation policies may offer some advantage over existing coverages for some employers. Legitimate no-fault laws with strong verbal thresholds offer some potential to lower auto insurance costs in some states.

To their credit, Kramer and others have raised public awareness of adverse market conditions in workers' compensation and private passenger automobile insurance. Insurance regulators' concern about these markets provided the impetus for the NAIC's current studies. The NAIC's Workers' Compensation (EX4) Task Force and the Personal Lines—Property and Casualty (C) Committee are providing oversight for these studies and are also engaged in other activities designed to gain a better understanding of and improve conditions in the workers' compensation and private passenger auto insurance markets.

To develop solutions to the problems that face these markets, it will be necessary to build coalitions of consumers, regulators, insurers, and other groups. To be successful, such efforts must be predicated on a realistic appraisal of the root causes of rising costs and rates, and a willingness to make tough choices. States such as Oregon, Colorado, Texas, and Florida have been successful in enacting meaningful workers' compensation reforms, thereby reducing the upward pressure on costs and rates. Information and education alone will not guarantee a resolution of these problems, but they are the only antidotes to the self-delusion that we have.
‘Rate Suppression And Its Consequences:’ A Critique

J. Robert Hunter

Abstract

The President of the National Insurance Consumer Organization responds to Orin Kramer’s “Rate Suppression and Its Consequences,” which appeared in the Summer, 1990, issue of the Journal. He challenges both the hypotheses and the methodology used in the earlier article and finds that the resulting conclusions are both bizarre and inconsistent.

Orin Kramer’s, “Rate Suppression and Its Consequences,” published in the Summer issue of the JIR attempts to identify states that are what he terms “rate suppression” jurisdictions and to determine the consequences of such supposed suppression. Kramer hypothesizes that rate suppression occurs because some states have added an element to their rate regulatory philosophies—the element of “affordability,” that Kramer says is an “income redistribution policy.” He focuses on private passenger auto insurance and workers’ compensation insurance because, according to him, these “coverages represent the heart of the property and casualty insurance business, together, they produced 50 per cent of the property and casualty insurance industry’s premium volume in 1990.”

Kramer implies strongly that rate suppression is an underlying cause of solvency problems. To identify states that have suppressed rates, Kramer relies upon any two of these three criteria:

* He is President, National Insurance Consumer Organization.
2. Id. at 324.
1. A residual market in 1989 that represented at least 10 per cent of the total market for private passenger auto or 20 per cent of the total market for workers' compensation.

2. Average negative operating income over the 1987–1989 period for private passenger auto or workers' compensation, and

3. A history of disapprovals of rate requests by the major rating bureaus over the 1987–1989 period.

Those tests were applied separately for private passenger auto and workers' compensation on a state-by-state basis.

Kramer also concludes that looking at all income of the insurer, called "total return ratemaking," is "inappropriate for the property and casualty insurance business," mainly because the market is competitive. Kramer said "competitive pricing provides greater benefits for consumers" than total return regulation, although his consumer credentials are non-existent and his work for the industry, particularly for its mouthpiece, the II is extensive [and expensive]. Kramer thus calls for competitive pricing laws and laissez-faire administration of such laws.

Analysis

(A) Are Kramer's "Suppressed" States Really Suppressed?

Kramer concludes that the following states (shown in Tables 1A and 1B, pp. 336–539) are suppressed.

To test Kramer's "suppressed" state theory, we have displayed in Table 2, next to his list of states, the profits for 1987, 1988, 1989, 1990, the three years studied by Kramer (1987–1989) and the six-year aggregate for 1985–1990. We used a six-year period to gain credibility of the indications, to be more stable, and to spread results over the industry's economic cycle.

Amazingly, for the 1987–1989 average profit, we found that 18 of the 29 "suppressed" states did better than the national average profit. In 1990, 15 of the 29 states outperformed the national average profit. For the six-year period ended 1990, 16 of the 29 states had profits above the national average. One must wonder how Kramer finds states to be "suppressed" when they are more profitable than average.
Another interesting thing about the table is that a jurisdiction can be "suppressed" even though it clearly has excessive overall profits [look at the District of Columbia or Vermont as examples].

Kramer finds some states "suppressed" for auto but not for workers' compensation and vice-versa. These insurance commissioners must be schizophrenic in their rate-making philosophy. Arkansas, a "suppressor" of workers' compensation, had a six-year profit of 7.1 per cent of net worth, while the unsuppressed auto profit was about half that (4.4 per cent). Similarly, Iowa "suppressed" workers compensation to a six-year profit of 11.6 per cent vs. a lower 9.0 per cent for private passenger auto and Kentucky "suppressed" workers compensation to a 14.0 per cent return vs. 4.7 per cent for unsuppressed auto.

The idea of selective rate suppression by an insurance commissioner is a bit like being a little pregnant! Consider Nevada, which Kramer finds suppresses auto, but had a six-year workers' compensation profit of 89.3 per cent return on net worth. The author's personal favorite finding of Kramer's is that NCCI President Bill Hager suppressed workers' compensation but not auto when he was Iowa's Commissioner!

This odd on-again-off-again suppression becomes even more unreal when one studies the detail of private passenger profit. Here is the six-year result for the "suppressed" private passenger auto states:

The schizophrenic continues! The suppressors tend only to suppress private passenger auto liability, not physical damage. Why?

It is also interesting to note that the industry-anted supression capital of the country, New Jersey, had profits over the last six years of almost 50 per cent over the national profit.

(B) Why Did Kramer Obtain Such Bizarre Results?

Kramer chose three criteria for deciding if a state suffered from rate suppression. Only one is a valid criteria. We consider them below.

His criteria for finding that a state suppressed rates—that the Department disapproved a filing by one of the two leading rating organizations over the last three years is an inappropriate criterion. The cartel-type organizations (the Insurance Services Office, Inc.—ISO—and the National Council on Compensation Insurance—NCCI) are well known for their incredible overreach in pricing. One cannot blame them, they want to be sure that the rate is sufficient
<table>
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<th>Rate Filing</th>
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Source: NAC By-State Profitability Report, Conning & Co., National Council of Compensation Insurance; Telephone Survey; Kramer Associates Analysis

for the least efficient, mismanaged insurance company that is a member of the cartel. For instance, unless forced to do so they never reflect investment income in pricing. Any state that did not challenge these rate filings in a three-year period would simply not be doing its job. This test makes no sense at all.

The second test, the percentage in the residual market is arbitrary and does not reflect differences between states in such mechanisms. For example, some states have assigned risk plans while others have reinsurance facilities. The latter often has no penalty for laying off questionable risks so that insurers will make a market in all parts of the state. Such plans are expected to have large residual markets. Further, Kramer does not count high-priced substandard writers as "residual." They clearly are. Finally, Kramer appears to have used application-counts, not policy-counts as his basis. This
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overcounts the number of persons in the plan. The basis for the arbitrary percentages he uses is unexplained.

Since failing any two of these criteria makes the state a suppressor and given the above criteria, it is understandable why the Kramer findings are nonsense.

(C) Solvency

Everyone can name a property/casualty insuror that failed because of mismanagement or fraud. But no one can name an insurer who became insolvent because of rate suppression, simply because there are none. The author believes that is because even the most avid regulator will not hold prices down for an insurer in financial trouble. Kramer’s linking of his rate suppression theory to insolvency has no validity.

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**USA: N/A**

**Suppressed Over USA:** 13 16 20 18 15 16

**Under USA:** 16 13 9 11 14 13

Source: NAIC Report on Profitability By Line By State, 1990
TABLE 3
Six-Year Results of 'Suppression' of Rates for Private Passengar Autos

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(D) Total Return Ratemaking

Kramer concludes that property/casualty insurance is competitive so total-return ratemaking is not appropriate.

The degree of industry competition is traditionally evaluated in terms of the economic structure, conduct and performance in relevant markets. On each of these scores the property/casualty insurance industry falls short of attaining the status required to justify the conclusion that competition will hold down prices and investment income need not be included fully in prices. In this industry, the hand of competition is not merely invisible, in many ways it simply is not there.

The degree of real competition in property/casualty insurance, particularly personal lines, is problematical at best. To the contrary, substantial factors, common in most states, work strongly against the heroic conclusion that competition provides consumers with sufficient protection from excessive rates so that regulators simply need not worry about investment income. In particular:

- Price-fixing beyond that considered advisable by the NAIC continues to be permitted in most states, and price-fixing beyond the limit found appropriate without further inquiry by
the National Commission for Review of Antitrust Laws and Procedures is permitted in all states.

- Marker allocation agreements, for which there is no economic justification, are tolerated.
- State laws permit private restraints on price competition by permitting resale price maintenance.
- The potential for downward pressure on prices is siphoned off into such non-price channels as relaxed underwriting standards that enhance carrier revenues and assets rather than reduce policyholder costs. In this way consumers get little or no benefit, while their lack of market sophistication and the threat of coverage denial or cancellation stultifies willingness to shop for the best price.

This conduct occurs in insurance markets that are not properly structured for or amenable to competition in the first place:

- Although comprehensive, understandable and accurate comparative price and product information is an essential precondition for effective price competition, most consumers, especially in personal lines markets, are disadvantaged by inadequate information.
- Personal lines markets are increasingly and now significantly concentrated in most states, with a small number of firms enjoying a dominant market share.
- "Entry barriers" for nationwide direct writers are high, muting competitive pressure where competition could otherwise be possible. Although entry barriers are low for the agency-writing segment of the industry, competitive potential is crippled by antirebate statutes, rate bureaus and other factors that inhibit lower prices for consumers.
- State laws often impede competition in other ways, such as by prohibiting true group underwriting, and by requiring all firms to share losses through guaranty funds if any carrier fails.

With all the research he did, we are surprised that Kramor did not find this conclusion of the National Association of Insurance Commissioners.3

The Task Force has not been able to find any economic justification for the traditional 5% profit allowance. Without being related in some way to an investment base (either assets or net worth), a return on sales or premiums has very limited value as a measure of profitability. For purposes of comparing profits with those of other industries, the measure is meaningless. The Task Force finds that the use of 5% or any other arbitrary and unsupported percentage of premiums is no longer appropriate in the regulation of property/casualty rates.

The transition to methodologies which give explicit consideration to investment income will be a significant one. The "percentage of premiums" approach to ratemaking has long been in use, and offers the comforts of familiarity and ease of application. These advantages are outweighed, however, by the fact that the use of 5% of premiums (or 2.5% for workers compensation) as a profit loading has ceased to perform the function for which rate regulation is undertaken.

Estimates of losses, expenses, and investment income are used by insurers in combination with overall profit objectives to determine the price at which its policy will be written. The Task Force concludes that the total return approach is the most appropriate one for use in direct approval jurisdictions.

Conclusion

The Kramer report is surely an Alice in Wonderland piece. All he asks of us is that we follow the Queen of Heart's advice:

"I can't believe that," said Alice.

"Can't you?" said the Queen in a pitying tone. "Try again. Draw a long breath and shut your eyes."

Alice laughed.

"There's no use trying," she said. "One cannot believe impossible things."

"I dare say you haven't had much practice," said the Queen. "When I was your age I always did it for an hour a day. Why, sometimes I've believed as many as six impossible things before breakfast."

4. Lewis Carroll, Through the Looking Glass, Ch. 6.
Introduction


The primary task of the pricing actuary is the development of premium rates and of risk classification systems by line of business. The work comprises two parts:

- The statistical analysis of insurance experience and of outside data to devise optimal classification systems and to set appropriate rate relativities.
- The balancing of statistical indications with notions of "social equity" and "fair discrimination," along with the defense of risk classification systems before state insurance departments, courts, and legislatures.

The first part of this work is entirely "actuarial," and sophisticated analyses of these issues, such as "minimum bias classification systems" and "territorial clustering for automobile insurance," may be found in actuarial journals and in the CAS examination syllabus. The second part of this work, although equally important, has been ignored by many practicing actuaries, since court decisions and regulatory enactments vary so greatly from state to state.

The diversity of public opinion regarding different types of risk classification illustrates the actuary's dilemma. On the one hand, no one objects to the setting of Homeowners insurance premium rates by construction class (frame buildings vs. masonry vs. fire-resistive) and protection class (proximity to fire stations and fire hydrants). On the other hand, no insurer would think of setting different life insurance rates according to the race or ethnic group of the applicant, despite the differing mortality rates for these groups.

Two reasons contribute to this disparity:

- First, construction class and protection class are intrinsic to a building susceptibility to fire damage. These are the causative
factors linking the attributes of the insured property and the expected insurance loss costs. Conversely, race and ethnic groups are not considered to be causative factors affecting mortality rates. Rather, race and ethnic groups are associated with other characteristics, such as socioeconomic group and access to medical care, which are strongly correlated with mortality rates.

- Second, classification by construction class or by protection class does not impinge upon American standards of justice or discrimination. Conversely, classification by race or ethnic group is socially objectionable, even if race or ethnic group were to be considered inherent factors affecting mortality rates.

In the vast and shifting middle ground, however, casualty actuaries lack firm support upon which to base their practice. Consider risk classification variables for personal automobile insurance. Loss costs differ greatly by the age and sex of the vehicle's driver. Are age and sex appropriate classification dimensions, like construction class and protection class, that are intrinsically linked to automobile accident hazards? Are they socially objectionable classification dimensions, like race and ethnic group, that improperly discriminate against innocent groups of citizens? Or do age and sex fall into a nebulous middle group, not ideal classification dimensions but not illegal ones either, yet necessary for equity among policyholders and vital for the financial stability of the insurance industry?

Philip Stano's JIR paper, "Trifling with Risk Classifications: A Risky Business," examines the legislative, regulatory, and judicial perspectives on several contested classification dimensions used in life and health insurance. Some of these issues, like the propriety of testing for HIV infection in life and health insurance underwriting, have little application to property and casualty lines of business. Other issues, such as the appropriateness of rate differentials by age and by sex, have provoked greater public debate for automobile insurance than for life and health coverages.

This is hardly surprising. Age and sex are physiological attributes with clear effects on mortality rates. Although the correlations of age and sex with automobile accident rates is equally strong, the underlying nature of the relationship is unclear.

- Are younger drivers less mature or simply (on average) less experienced than older drivers are? Eighteen year old drivers have
higher accident rates than forty year old drivers do. But would just-licensed 18 year old drivers also have higher accident rates than just-licensed 40 year old drivers? Should years of experience replace chronological age as a personal automobile classification variable? Most actuaries would say "no"; some politicians and "consumer activists" say "yes."

- Are male drivers less careful than their female counterparts, and more inclined to view driving audacity as a reflection of their power? Is a mother of two young children—mindful of the carefree nesse of her own offspring—more watchful of road hazards and intrusive pedestrians than is her husband? Or do female drivers simply drive less (on average) than the male drivers, leading to lower accident frequency rates? Here again, most actuaries would not assign male-female differences in automobile accident rates simply to "mileage driven." Yet some states have proscribed such male-female rate differences as socially objectionable sex discrimination.

The actuarial examinations are now placing greater emphasis on the non-statistical issues relating to risk classification, such as legal and social considerations or "standards of practice" for risk classification. Stano's paper, which presents the life and health insurance controversies on this topic, is an excellent backdrop for the casualty actuary wrestling with similar issues in automobile and homeowners insurance.
Trifling With The Risk Classification System

A Risky Business

Phillip E. Stano

Abstract

This article is an expanded discussion of a presentation on risk classification that the author first made at a NAC Seminar in Louisville, Ky. After explaining initially the importance that risk classification plays in maintaining solvency and fairness in the life and health insurance business, the author explores in the second portion of his article how certain insurance departments have departed from these concepts in their efforts to promote social policies for AIDS victims, women, and the elderly. He warns that although these aims are worthy, the results may be antithetical to the goals of insurance regulation—solvent companies that treat fairly each class of persons they insure.

* The author appreciates the able assistance of Gary Simms, General Counsel of the American Academy of Actuaries, for his succinct explanation of risk classification concepts. He also deeply appreciates the editorial and research assistance of ACLI staff members, J. Bruce Ferguson, Daniel E. Cane, Richard V. Mitnick, David M. Lelio, Elmer A. Miiller, and David Wilson, and the help of his secretary, Kimberly Wilkerson, for the numerous weekends spent typing this paper. The opinions expressed in this paper, whether explicit or implied, are solely those of the author and do not necessarily reflect the views of the American Council of Life Insurance or its member companies.

This article was originally presented before The National Association of Insurance Commissioners Legal Education Seminar, held in connection with the NAC 1990 Winter Meeting, Louisville, Ky. (Dec. 1, 1990) and was later adapted and updated for the Journal of Insurance Regulation.

* ACLI’s counsel, responsible for litigation and its legislative director.
Introduction

The bedrock concept of a workable, private, and voluntary insurance system is that risks with similar characteristics must be grouped for the purpose of determining insurability and price. This process—called "risk classification"—both allows insurers to exercise their right to earn a reasonable profit, and provides an equitable insurance system to policyholders.2

"Risk classification" is a process in which an insurer develops a number of different categories ("classes") that accurately reflect the varying degrees of risk that members of the classes represent. Although individual outcomes cannot be predicted, trends and averages for classes composed of individuals with similar characteristics can be predicted with some degree of certainty. It is upon this basis that modern insurance operates, and upon which its financial stability depends. 3

During the last five years, it has become increasingly difficult to maintain the integrity of the risk classification system, because some insurance regulators have skewed these principles by requiring insurers to base underwriting decisions solely on social rather than economic, actuarial, or scientific considerations. These efforts are, in part, a response to pressure: from special interest groups that attempt to force insurers to provide insurance coverage to a number of individuals at a premium rate that does not reflect costs or risk. This paper discusses from a life and health insurance perspective the

3. AMERICAN ACADEMY OF ACTUARIES, RISK CLASSIFICATION STATEMENT OF PRINCIPLES 1 (1983), [hereafter "STATEMENT OF PRINCIPLES"]; see BLACK & SEIFFER, STATEMENT OF PRINCIPLES, supra Note 3, at 1.
interaction of settled risk classification principles with these recent regulatory efforts, which has resulted in litigation by the insurance industry.

Risk Classification—An Overview

"The vocabulary of insurance can be misleading. In the context of insurance, discrimination is not necessarily bad; equality not necessarily good."

The Principles of Risk Classification

The fundamental principle of risk classification is that pricing should be based on risk. Insurance, by its very nature, is recognized as being "discriminatory" in that individuals who represent a higher risk are routinely charged a higher premium rate. For example, a smoker is charged a higher premium for a life insurance policy than a non-smoker, because—all other things being equal—a smoker represents a higher mortality and morbidity risk than a non-smoker.

"Underwriting" of insurance is the process that an insurer uses to determine whether, and on what basis, it will accept an application for insurance. It applies the principles of risk classification to


a particular insurance applicant or block of business to determine if insurance coverage will be provided and what premium rates will be required. It is performed properly when the applicant's expected future mortality and morbidity have been estimated properly (i.e., the applicant has been classified properly as to the mortality or morbidity risk he represents). Thus, proper insurance underwriting involves rating and pricing that is based on the insured’s risk. The whole process, therefore, determines whether an insurer will offer coverage at all and can be summed up by the goals of underwriting: the selection of insureds according to the insurer’s underwriting standards, proper balance within each rate classification, and equity among policyholders.

State legislatures have approved the “discriminatory” aspects of insurance by frequently incorporating such principles into their insurance codes. This is not surprising, given that the unfair trade practices acts of most states are derived from the National Association of Insurance Commissioners’ (“NAIC”) Model Unfair Trade Practices Act, which prohibits, inter alia, any insurer from:

- making or permitting any unfair discrimination between individuals of the same class and equal expectation of life in the rates charged for any contract of life insurance . . . ” (8)

8. “Mortality” is defined as the “death rate at each age as determined from prior experience.” See Health Insurance Association of America, A Course in Group Life and Health Insurance (pt. A) at 379 (1985) (hereafter “HEA 1985”).
9. “Morbidity” is defined as the “incidence and severity of sicknesses and accidents in a well-defined class or classes of persons.” Id. at 366.
10. In any insurance plan, each insured person contributes to a common fund from which amounts are paid to or on behalf of the unfortunate ones who suffer covered losses. To maintain equity among insureds, each should contribute according to the loss probabilities he or she transfers to the common fund. If one person is allowed to pay less than his or her share, it will necessitate an overcharge against other persons. In each instance, therefore, the insurance company should determine the loss expense presented to it by the insured and charge a fair premium or rate. This cannot be accomplished without careful selection and classification of risks. Black & Sheaffer supra Note 4, at 404.
11. Id. See also Shepherd & Webster, Selection of Risks 1 (1957).
14. Id., § 4(7)(a). Similar requirements apply to other lines of insurance, including health insurance, § 4(7)(b), (c), and (d).
Confusion arises when insurance codes—which legitimate "discrimination"—may also authorize an insurance commissioner to prohibit matters found to be "unfair" or where a commissioner imposes his own concept of fairness on the insurance classification system. Such seemingly inconsistent statutory provisions and regulatory measures are more easily reconciled if it is recognized that "discrimination" and "unfairness" are terms of art in the insurance context. They are closely linked with the term "equity."10

In insurance, "discrimination" is necessary and appropriate, so that individuals who represent different risks pay premiums commensurate with their risk. The goal is not equal treatment of policyholders, but equitable treatment.11 Accordingly, states explicitly permit discrimination—when fair—in the issuing of insurance policies.12 Indeed, the risk classification system is a frank expression of such discrimination. Unfair discrimination, on the other hand, is not permitted. "Unfairness," in the insurance context, occurs when equal risks are treated differently and/or unequal risks are treated equally.13 In other words, unfair discrimination occurs when there is no sound actuarial or medical justification for the manner in which risks are classified. For example, charging blue-eyed insurance applicants a higher pre-


16. For example, Wash. Rev. Code § 48.01.030 requires, inter alia, that insurers practice "honesty and equity in all insurance matters" (emphasis added).

17. See The Regulatory Challenge to Life Insurance Classification, supra Note 5, at 782 (1976).


mium than brown-eyed insurance applicants is unfairly discriminatory, because there is no recognized actuarial, medical, or scientific basis for such treatment.

Applying these principles to insureds with high-risk characteristics, commentators,20 courts,21 and regulators have recognized as well-established that these persons should pay more for their insurance coverage. For example, the Utah Attorney General’s office recently acknowledged the proper role of fair discrimination in the insurance context. Informal Opinion No. 89-48 addressed the authority of the Utah Insurance Commissioner to adopt a rule22 that among other things, prohibited an individual with HIV-infection from being discriminated against unfairly for insurance purposes. The Utah Attorney General referred approvingly to those sections of the rule that prohibited unfair discriminatory practices, noting:23

R540-133 prohibits a person with HIV-infection from being singled out for “unfairly discriminatory or preferential treatment.” It does not prohibit insurance licensees from discriminating against persons with the HIV-infection. In fact, it is anticipated that a prospective insured may be declined insurance coverage or be rated

21. [A] steetleblack obviously presents a greater risk than a housewife. The steetleblack would be exposed, in the interest of equity, to a higher premium than the housewife for the risk to which he is exposed. The price he pays is called "substantial" to distinguish it from the normal premium, but he and other steetleblack are paying a premium which in reality is "standard" for their particular class of risk.

See also BLACK & kennenlernen, supra Note 4, at 404 (principles of equity dictate that insureds with substantial health risks be charged higher premiums); HOFFMAN & Kincaid, AIDS: The Challenge to Life and Health Insurers’ Freedom of Contract, 35 DEAR L. REV. 709, 717 (1986) (“An applicant presenting a low risk of loss to the insurer should not be required to subsidize another applicant who presents a higher degree of risk.”)

21. Langen v. United States Life Ins. Co., 344 Mo. 989, 997, 130 S.W.2d 479 (1939) [Missouri’s unfair trade practices statute declares a “legislative policy that the older the applicant the more he shall pay for a given amount of insurance”]; Physicians Mut. Ins. Co. v. Denenberg, 15 Pa. Commonwealth, 509, 513, 327 A.2d 415, 416 (1974) [health insurance policy provisions providing an initial monthly premium of only 41, regardless of insurance coverage or risk of insured, were unreasonably low and unfairly discriminatory under Pennsylvania’s unfair trade practices statute].


substandard because of the HIV-infection. See R50-132–3. Such classification would be "fair" discrimination since it could be supported by valid data showing a statistical difference in loss. What is not allowed under §§ 31A-23–302(3), 31A-23–302(8) and the administrative rule are classifications not related to the nature and degree of the risks covered. Such classifications would amount to unfair discrimination. Certainly a prohibition in the rule against "unfair discrimination" for insurance purposes could not be considered contrary to or beyond the scope of the statute. The statute itself, as § 31A-23–302(3), provides that an insurer may not unfairly discriminate.

Thus, the recognized proper goal of risk classification is not equality of treatment of insureds but equitable assignment of each insured to the risk category or she properly represents.

History

The risk classification system has developed without specific regard to any of the individual risks to be assumed. It has evolved independently of the response to a particular disease or medical condition and has established the framework within which underwriting for all medical conditions can be performed.

A review of the history of underwriting may be helpful in understanding how its principles apply to present-day diseases and developing medical knowledge. When life insurance policies were first written in England during the latter part of the 16th century, the applicant usually appeared before the directors of the company and was personally examined by them as to the state of his health. As early as 1725, the soliciting agent for a British insurer was instructed, "to learn, if possible, the reason why the assurance is made, for unless there are good reasons ... the person assured may be in a worse state of health than you apprehend." Questions included matters

24. STATEMENT OF PRINCIPLES, supra, Note 3, at 1.
26. Id. at 8. See also P. SHEPHERD & A. WEBSTER, SELECTION OF RISK 1, 5 (1957) ("Originally, also, it was necessary for the proposed insured to be recommended to the company by one who was already a member and who was personally acquainted with him. The presumption was that the member would recommend only good risks.")
Actuarial Principles and the Politics of Ratemaking

relating to the serious health concerns of the time, such as small-
pox.27

The first major differentiation was based on the age of the in-
sured, beginning with the first writing of modern ordinary life poli-
cies in 1762 by the Old English Equitable, the first mutual insurance
company.28 During the 19th century, many current-day underwriting
practices were developed, including using family medical history, 
medical examinations, detailed questions on application forms
about the applicant's health status, a numerical rating system (based
on such factors as height, weight and medical information), and rat-
ings for occupation.

In the earliest days of underwriting, only two classes were de-
scribed: insurables and uninsurables. However, in the early part of
the 20th century, companies began underwriting insurance for some pre-
viously uninsurables, calling them "substandard" policies. Over
time, as experience developed, the number of these substandard cat-
gories expanded and refined. Today, as many as 15 to 25 differ-
ent substandard categories may be used by insurers, with premium
rates based on anticipated costs of providing the coverage.

One important result of this increase in the scope of underwrit-
ing categories has been to expand availability to broader segments
of the general population, for insurers seek better market penetration
by competing not only for lower-cost risks, but also for higher-cost
risks within the same market. Increased market penetration provides
opportunities of scale in the marketing or distribution functions. Com-
petition motivates an insurer to be reasonably refined in its risk clas-
sification system so that its pricing parallels closely the risk as-
sumed. Thus, competition for increased market share is an incentive
to develop finer risk classification by reflecting accurately the dif-
fentials in expected costs among identifiable classes of risk.29

27. R. Brackenridge, Medical Selection of Life Risks: A Comprehensive
28. E. McConney, Outlines of the History of Life Insurance in the United
States 5 (1927) (hereafter "McConney"). These practices were updated to reflect oc-
cupational changes in society, inventions, new avocations, and medical advances. For
example, policies issued in the early 1900s required extra premiums for those who
flew on commercial airline flights. As the safety of air travel improved, the extra
premiums were eliminated. See P. Shepherd & A. Webster, Selection of Risks,
supra Note 26 at 6.
Note 4 at ch. 24 (analysis of life and health insurance underwriting principles).
The factors presently used in life and health insurance underwriting include age, sex, family medical history, current physical condition, personal medical history, occupation, alcohol and/or drug use, smoking, travel in unhealthy or hazardous areas, and dangerous avocations. 99

Note that underwriting has been and remains an evolutionary, dynamic process, guided by the underlying premise of classifying risks equitably into their proper premium category and characterized by adapting to changes in the incidence of disease, medical advances, technological developments, and socio-economic factors.

Adverse Selection

Improper or nonexistent risk classification can lead to “adverse selection,” a situation where the insurance applicant—but not the insurer—recognizes the likelihood of an early claim. 50 Adverse selection results from the interaction of economic forces between buyers and sellers of insurance. In a relatively free market, where buyers can select from among many different sellers of insurance, buyers are motivated to minimize the cost of coverage offered. This may create dramatic movements of buyers to different sellers when these sellers, through inadequate information, use risk classification systems and underwriting practices that fail to reflect anticipated costs adequately. The opportunity for adverse selection most often arises when relevant information is not used in the risk classification process and the insured is placed in a group with a premium rate too low for the risk. Risk classification minimizes adverse selection by balancing the economic forces that govern buyer and seller actions. 51

30. BLACK & SKIPPER, supra Note 4, at 408–17. These factors may be tested by blood pressure readings, blood tests, urinalysis, chest x-rays, electrocardiograms, physical evaluations, and detailed questions on applications. Medical advances have reduced the underwriting emphasis on certain diseases such as tuberculosis and diabetes and shifted it to other diseases, such as cancer and heart disease, which have become leading causes of death. For example, recent underwriting experience has focused attention on detecting alcohol through blood tests. See BETS et al., Substance Abuse and Underwriting, 1 J. RECORD OF THE SOC'Y OF ACTUARIES 2341, 2341–40 (1984).
31. BLACK & SKIPPER, supra Note 4, at 406.
Since adverse selection occurs when parallel prices do not reflect expected costs, a reasonable risk classification system designed to minimize adverse selection tends to produce valid and equitable prices—i.e., not unfairly discriminatory.33

By withholding relevant adverse information, the applicant enjoys an informational advantage that may result in his placement in an inappropriately low-price category. A group that contains a large number of such insureds will eventually experience higher claims than were anticipated when the premium rate was originally established. If possible, an insurer will increase premium rates to reflect the unfavorable claims experience. This, in turn, will motivate the lower-risk insureds in the category (those appropriately placed there in the first instance) to seek lower-cost coverage elsewhere. The remaining portion of the group will thereafter exhibit a still worse average experience and further escalation of premiums. This upward cost spiral either results in the desired coverage becoming unavailable to that group on any affordable premium basis or in the insurer becoming insolvent, a fate which actually befall many companies during the 1800s and the early 1900s.34

**Benefits Of The Risk Classification System**

The three recognized goals of responsible insurance regulation are:

- First, to avoid overreaching by insurers;
- Second, to assure solidity and solvency of insurers; and
- Third, to assure that rating classifications and rates are reasonable and fair.35

Court have recognized that a properly functioning risk classification system furthers the regulatory goals of maintaining

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33. Differences in prices among classes should reflect differences in expected costs with no subsidy among the classes. See Statement of Principles, supra Note 3, at 9.

34. E. McConnell, supra Note 28, at 5–24.


Hoffman & Kishald, supra Note 30, at 723, have summed up the advantages of respecting the risk classification system thus:

> By requiring adherence to meaningful classification systems, the unfair trade practices statutes assist regulators in ensuring that companies are not rendered financially unstable as a result of improper classification.
policymaker fairness and insurer fiscal insecurity. In In The Matter Of Health Insurance Association of America v. Corcoran, the New York Supreme Court (Appellate Division Third Judicial Department) unanimously struck down a New York state regulation that prohibited insurers from testing applicants for individual and small group health and accident insurance policies to determine if they are infected with the HIV virus.36 The court held that the insurance superintendent exceeded his authority by substituting his own ideas of societal policy choices for legislatively recognized principles of insurance.37 The court commented on the value of maintaining the integrity of the risk classification system.38

Differential premium rates on the basis of sound underwriting practices accurately assessing risks/future costs are not by nature misleading to the public or prejudicial to policyholders. Indeed, valid underwriting practices promote fairness to the policyholder in not requiring him or her to bear the full premiums the costs of insuring others in higher risk categories, and solvency of the insurer, another goal of insurance regulation.

The risk classification system also provides enormous benefits to the public by making life and health insurance coverage widely available and affordable. More than 156 million individuals nationwide have life insurance coverage. The overwhelming majority (approximately 96 per cent of ordinary life insurance policyholders) were categorized as "standard" (i.e., normal) risks for insurance purposes and were charged standard insurance rates.39 Similarly, most insurers accept 70-80 per cent of applicants for individual health coverage at standard rates.40 Declination rates for most insurers of individual health risks are below 10 per cent.41

37. See discussion, infra, at Notes 54-64
38. 551 N.Y.S.2d at 618-19.
40. BLACK & SIEPPEN, supra Note 4, at 456. See also ACLI 1989 Life Insurance Fact Book Update 54.
42. Id.
Whether the life insurance industry's risk classification system is fair can be measured by examining the accuracy of its underwriting decisions. Such an analysis occurred in a five-year study of the mortality experience of $4.7 billion of substandard individual life insurance coverages placed among 12 insurers.43 According to the study the actual mortality during the first 15 policy years on policies rated "slightly" substandard [less than 175 per cent], "moderately" substandard [175–250 per cent], and "highly" substandard [greater than 250 per cent] was 154.1 per cent, 192.4 per cent and 300.9 per cent for each respective category. The study concluded "that there is in fact a strong correlation between the degree of rating assigned by the issuing company and the actual level of mortality experienced on such business."44

Thus, properly used risk classification concepts fuel an efficient system and provide low-cost insurance fairly and equitably to millions of policyholders.

Regulatory Implementation of Risk Classification Principles

An insurance regulator exceeds his authority when, by regulation, he effectuates his own vision of societal policy choices . . . over subjects not contemplated or required by the Legislature and, in doing so, substantially eliminates sound underwriting practices previously sanctioned and encouraged under basic principles of insurance law and regulation.45

This portion of the article discusses the strain placed on the integrity of the risk classification system when regulations require insurers to offer coverages at a premium level that does not comport with actuarial or economic realities. Such regulations force insurers to inflate unfairly the premium charged lower-risk insureds and deny insurers

43. A standard insurance risk is thought of as 100%, while substandard insurance risks are described as a percentage of standard (e.g., a 250% substandard rating equals a risk 2.5 times that of standard).


their right to earn a reasonable profit. Often, when a commissioner imposes his personal vision of "fairness," equity, or public policy in this fashion, it constitutes an excessive use of his statutory authority and results in unfairness to others [i.e., low-risk or other high-risk insureds] in the insurance marketplace.

AIDS

In the past two years, at least 15 states and the District of Columbia have adopted insurance-related legislation or regulations that addressed AIDS-related testing in an insurance setting. These enactments have generally restricted availability of information to those within the insurance industry who have a legitimate need for it.46 However, the courts have been extremely reluctant to tamper with the risk classification system by permitting a commissioner, however motivated to engrat his notions of "fairness" onto the risk classification components of insurance underwriting by banning AIDS tests.47 Two recent decisions that involved commissioners who made this attempt (by adopting AIDS regulations that treated unlike risks as like risks) illustrate this point.

It is undisputed that individuals infected with the Acquired Immune Deficiency (AIDS) virus (also known as the human immune-deficiency virus—"HIV") have a substantially higher mortality and


The following AIDS confidentiality statutes and regulations were enacted in 1990: ARIZONA H.S. 2173 (to be codified as A.R.S. § 20-449.01); KENTUCKY F.S. 425 (to be codified at K.R.S. § 304.17-053); § 18A, North Dakota Reg. 45-03-11; VIRGINIA INS. REG. No. 36; WIS. STAT. §631.93.

47. See N.Y. INS. LAW SERVICE, AIDS ONE [1988] (multifaceted discussion of the legal, social, and ethical issues facing the insurance industry as a result of AIDS).
morbidity risk than individuals of average health.48 In *Life Ins. Ass’n of Mass. v. Comm’n of Ins.*,49 the ACLI and others successfully challenged a Massachusetts regulation that would in effect attempt to treat individuals with the AIDS virus as “standard” risks by severely restricting insurers’ right to test insurance applicants for the presence of the AIDS virus. The stated purpose of the regulation was to prohibit unfair discrimination in underwriting decisions and to protect the privacy rights of applicants who had been requested to take the test.50

The Supreme Judicial Court of Massachusetts unanimously rejected the insurance commissioner’s attempt to alter the risk classification system and to impose underwriting limitations. In striking the regulation, the court stated:51

The basic principle underlying statutes governing underwriting practices is that insurers have the right to classify risks and to elect not to insure risks if the discrimination is fair. . . . The statutory pattern authorizing insurers to discriminate fairly and to seek information from insureds in order to do so is antithetical to any implication of a right of a commissioner to forbid or limit insurers’ conduct in this respect. . . . In light of a general legislative policy of requiring fair classifications of risks and of permitting insurers to decide whom to insure . . . it is not reasonable to conclude that the Legislature intended the

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48. See National Institutes Of Health, *The Acquired Immunodeficiency Syndrome: An Update*, 102 AM. INT. MED. 800, 802 (1985) (“[A] patient who has unequivocal acquired immunodeficiency syndrome has yet been cured of this invariably fatal disease”); American Medical Association (Council On Scientific Affairs), *The Acquired Immunodeficiency Syndrome*, 232 J. AM. MED. ASS’N 2937, 2941 (1984) (“[A]t present, there are no cases of AIDS in which the immune system has been reported to have recovered”); U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, SONGER: GENERAL’S REPORT ON ACQUIRED IMMUNE DEFICIENCY SYNDROME at 12 (1986) (“The number of persons known to have AIDS in the United States to date is over 25,000; of them, about half have died of the disease. Since there is no cure, the others are expected to also eventually die from their disease”); U.S. PUBLIC HEALTH SERVICE, PUBLIC HEALTH SERVICE PLAN FOR THE PREVENTION AND CONTROL OF AIDS AND THE AIDS VIRUS at 2.7 “Report Of The Coalition Planning Conference,” June 4–6, 1986 (hereafter cited as “Report Of Coalition Planning Conference”); “[I]n the past 5 years, more effective therapies for . . . AIDS have been found, but no cure for AIDS is yet available.”
50. 310 N.E.2d at 169.
51. 310 N.E.2d at 171–72 (emphasis added).
commissioner to have an implied right to regulate underwriting practices with respect to investigating and insuring persons who may have HIV. If we were to accept the commissioner's argument that he had implied authority to issue these regulations governing the underwriting practices of insurance companies, it is hard to see what restrictions there would be on the commissioner's right to control any and all activities of insurers by regulation.

The court based its reasoning primarily on the provisions of the Massachusetts Unfair Trade Practices Act which espouses risk classification principles similar to those found in the insurance codes of many states. The Massachusetts provision prohibits "making or permitting any unfair discrimination between individuals of the same class" in the rates charged for life insurance, annuities, accident, or health insurance. Massachusetts, like other states, acknowledges that, in the underwriting of insurance, discrimination is an essential element.

Similarly, the New York Supreme Court in Health Ins. Ass'n of America v. Corcoran, supra, rejected the attempt by the New York Superintendent of Insurance to adopt a regulation that prohibited HIV-infected applicants for individual and small group health and accident insurance policies from being tested for the AIDS virus. If enacted, the regulation would have effectively classified these applicants as standard risks. When he promulgated the regulation, the superintendent relied exclusively upon the certification of the New York Commissioner of Health that the practices prohibited by the regulation were "contrary to the health care needs of the public." Supporters stated repeatedly at the public hearing on proposed adoption of the regulation that promulgation was a "public policy issue." The superintendent himself stated:

54. MASS. ANN. LAWS ch. 175, § 1097 (Law Coop. 1997) states in part that "no insurance company ... offering for sale policies of life, accident, health, disability, or accident insurance ... shall make any distinction or discrimination as to the issuance of such policy or the rates or premiums charged ... except where such distinction or discrimination is based on sound actuarial principles or is related to actual experience.
55. PHAA v. Corcoran, supra Note 45, at 616.
56. Id. at 616, 619.
57. PHAA v. Corcoran, R. 887-888, 1988, 974, 1690.
58. R. 1057, 1059. One of the leading articles that argued against HIV-testing of insurance applicants conceded that "the primary argument against such testing is
The public policy concerns have been emphasized from this end of the podium and from the other end too ... we know it's a public policy issue. I agree with that, and I think that has been emphasized a number of times.

The trial court declared the regulation void, finding that it "affords the person infected with HIV a preferred status over persons infected with other health threatening diseases or lifestyles. . . ."

On appeal, the court viewed the regulation as contrary to the risk classification principles enunciated in Section 4224 of the New York Insurance Law60 and other insurance code sections. It stated:60

[Provisions barring discrimination against insureds, akin to Insurance Law § 4224(b)(1), have been authoritatively construed not to apply when differential treatment has a proper underwriting basis. . . .]

It follows . . . that a health insurance underwriting practice that is valid in reasonably assessing risks of future health costs on an actuarial basis cannot be prohibited by [the insurance superintendent] under the authority of Insurance Law §§ 3201 or 4224. Such an underwriting practice is not unfair, inequitable, misleading or discriminatory. Indeed, as we have already discussed, appropriate classification of risks is sanctioned and encouraged throughout the Insurance Law. Without legislation more clearly suggesting that a


58. R. 20.

59. Section 4224(d)(1) states:

No life insurance company doing business in this state . . . shall: (1) make or permit any unfair discrimination between individuals of the same class and of equal expectation of life, in the amount or payment or return of premiums, or rates charged for policies of life insurance or annuity contracts, or in the dividends or other benefits payable thereon, or in any of the terms and conditions thereof.

The relevant portions of § 4224(b)(1) state that:

No insurer doing in this state the business of accident and health insurance . . . shall: (1) make or permit any unfair discrimination between individuals of the same class in the amount of premiums, policy fees, or rates charged for any policy of accident and health insurance, or in the benefits payable thereon, or in any of the terms or conditions of such policies, or in any other manner whatsoever . . . .

60. 551 N.Y.S.2d at 619 (emphasis added, citations omitted).
specific, sound underwriting practice is condemned, an insurance regulation forbidding the practice is, in effect, a rule making illegal that which is permitted by law.

Further, the court held that the superintendent exceeded his authority when, by regulation, he: 61

effect[ed] [his own] vision of societal policy choices ... over subjects not contemplated or acted upon by the Legislature and, in doing so, substantially eliminates sound underwriting practices previously sanctioned and encouraged under basic principles of insurance law and regulation.

Although the court sympathized that the AIDS epidemic posed a significant financial threat to the public and health insurers, 62 the court unanimously criticized the New York Superintendent's attempt to resolve this problem without clear legislative guidance as "social policy decision-making in the broadest sense. ..." 63 The court concluded that the regulations would effectuate a profound change in social and economic policy, a change that may be made only by the Legislature. 64

An Act of the District of Columbia Council ["D.C. Council"] that prohibited an insurer from refusing to provide insurance coverage to an individual who has tested positive for AIDS, although held constitutional, reveals the nature of judicial concerns that can arise from regulations and statutes of this type. In American Council of Life Ins. v. District of Columbia, 65 the federal court for the District of Columbia ruled that the Prohibition of Discrimination in the Provision of Insurance Act of 1986 ["Act"] 66 was constitutional under the Fifth Amendment to the United States Constitution and did not violate the D.C. Self-Government and Governmental Reorganization Act. 67 Under the challenged Act, life, health, and disability in-

61. 551 N.Y.S.2d at 622.
62. In 1989 alone, the life and health insurance industry paid out an estimated $1 billion in claims for AIDS cases. In the years 1996–89, the life and health insurance industry paid an estimated $2.4 billion in such claims. See ACLU/HAA SURVEY OF AIDS RELATED CLAIMS (Oct. 3, 1990) (unpublished).
63. Id. at 619–20.
64. Id. at 620–33.
67. D.C. Code Ann. §§ 1-204 and 1-231(a)(3)(1981/1981). The latter section states in part that "the Council shall have no authority to pass any Act ... [which] is not restricted in its application exclusively in or to the District, ..."
surers could reject insurance applicants who have been diagnosed as having the acquired immunodeficiency syndrome (or "AIDS"). However, an insurer could not "deny, cancel, or refuse to renew insurance coverage, or alter benefits covered or expenses reimbursable, because an individual has tested positive on any test to screen for the presence of any probable causative agent of AIDS . . . [not] because an individual has declined to take such a test." The Act also imposed a five-year moratorium on the use of HIV-screening tests to adjust premiums. Thereafter, insurers could seek approval from the Superintendent of Insurance to increase premiums and rates for individuals who test positive for exposure to the AIDS virus.

Plaintiffs, ACLI and the Health Insurance Association of America (or "HIAA") contended that the action of the D.C. Council was arbitrary and capricious, because the Act was based on the false premise that no accurate single test exists to predict the presence of the AIDS virus and that no such test has been shown to have any actuarial significance.

On cross motions for summary judgment, the court ruled in favor of the D.C. Council, because the plaintiffs "presented evidence to this court that was not available to the D.C. Council at the time the bill was under consideration." (The court did not base its deci-
sion on the accuracy or actuarial significance of such testing. The Court stated that:

Although the Court agrees that ... the D.C. Council should be encouraged to reconsider its decision, this report was not before the Council last spring and therefore cannot prove the irrationality of the law.

The court criticized the Act’s five-year moratorium on the use of AIDS screening tests for insurance underwriting and pricing purposes, stating that:

The nature of the rapidly changing landscape of AIDS research suggests that the D.C. Council may have acted too hastily in imposing the five-year moratorium on test increases. ... The Court agrees with plaintiffs that new evidence on the accuracy of AIDS tests for insurance purposes and the ever-increasing breakthroughs in AIDS research raise serious questions about imposing a five-year ban on screening applicants for AIDS.

of AIDS and the AIDS Virus [Report of the Coolidge Planning Conference] (June 4-6, 1986) at 5; affidavit of Warren L. Kleinmaier, M.D.
73. 645 F. Supp. at 87.

The report referred to by the court concluded that a series of AIDS-related tests was medically sufficient and reliable to determine the presence of the antibodies to the AIDS virus. See Jeffrey P. Davis, MD, HTLV-III Serologic Testing Paper Related to Wisconsin Statutes § 601.90 Pursuant to Underwriting Individual Insurance Policies (Aug. 6, 1986). This series of AIDS-related tests [known as “ELISA-Western blot”] has a recognized predictive reliability of 99.9% of determining the presence of the AIDS virus. Those who register positive under this series of tests have a 20%-30% chance of developing AIDS in 5 years and a 40% chance of developing AIDS or AIDS-Related Complex (or “ARC”) within 10 years.

See also Centers for Disease Control, Classification System for Human T-lymphotropic Virus Type III/Lymphadenopathy-Associated Virus Infections, 35(20) Morbidity and Mortality Weekly Report 838, 835 (May 23, 1986). The Centers for Disease Control have concluded that:

for public health purposes, patients with repeatedly reactive screening tests for HTLV-III/LAV antibody (e.g., enzyme-linked immunosorbent assay) or (Western blot) should be considered both infected and infective.

This series of tests does not diagnose AIDS, but is an accurate predicator of AIDS much as hypertension and cigarette smoking are predictors (although less accurate) of heart disease.

74. 645 F. Supp. at 88.
This pyrrhic victory for opponents of AIDS testing clearly questioned the wisdom of the D.C. Council in passing the Act. Not surprisingly, the Act was subsequently repealed. The right to test for the presence of HIV-virus to determine an applicant's health condition is consistent with the long-recognized "freedom-of-contract" rights of insurers.

Unisex

There is little doubt among courts or the scientific community that females as a class have a longer life expectancy than males as a class. Even insurance regulators who have led the battle to force unisex rates on the public concede that imposing unisex rates on the unequal risks that the sexes represent has led to increased costs for women in certain lines of coverage. For in spite of this recognition, states require gender-neutral rating in life and health insurance. The discussion that follows highlights the activities of regulators, the reaction of the industry, and the nature of the testimony presented both in hearings and court cases involving these states.

In Manufacturers Hanover Trust Co. v. United States, the Second Circuit Court was confronted with the question of whether reversionary interests of a decedent's estate valued by use of gender-based mortality tables violated the equal protection guaranteed by the Due Process Clause of the Fifth Amendment. The court held that such practice was constitutional, finding that "gender-based tables reflect the undisputed fact that, on the average, women live longer than men at every age." The Second Circuit concluded that:

75 In upholding the constitutionality of the Act, the court noted that "(i)t is a basic principle of constitutional analysis that a belief that an Act . . . may be equitable or unwise is of course an insufficient basis on which to conclude that it is unconstitutional." 645 F. Supp. at 88, quoting with approval Scheuer v. Hogan, 457 U.S. 509 (1982).

76 D.C. Code § 35-221 et seq.

77 See e.g., Murphy v. State Farm, No. C-88-4940 S.C., slip op. (D.N.D. Cal. May 19, 1989) (upholding company policy to refuse to issue life policy to any applicant who had within the last 5 years resided with someone with AIDS, no violation of California Insurance Code provisions prohibiting discriminatory practices in life insurance underwriting). See also Vander Veer v. Colonial Casualty Co., 34 N.Y.2d 50, 53 (1973) ("an insurer . . . is free to select its risk and . . . make inquiry of matters which it deems material to the risk").

78 775 F.2d 491 [1985].

79 Id. at 469. See Los Angeles Dept. of Water and Power v. Manhart, 435 U.S. 702, 724 [1978] (concurring opinion) approving recognition of "the objective and ac-
... the increased accuracy of gender-based tables constitutionally justifies their use. ... The classifications do not demean either gender and they are not based on stereotyped assumptions about the social roles men and women might choose."

**Massachusetts Telles v. Singer** involves a challenge by individual policyholders and insurers to the Massachusetts Unisex Regulation. In its Order upholding the constitutionality of the regulation, the trial court found as fact that "mortality rate for males are generally higher than ... of females." The Massachusetts Insurance Commissioner also conceded the point. Yet, the Massachusetts Insurance Department continues to defend its unisex regulation in spite of the Supreme Judicial Court's AIDS opinion underscoring an insurer's basic right to classify risk to achieve fairness and, in particular, to prevent one class of insureds subsidizing another. This fundamental principle of risk classification is also stated clearly in the Massachusetts Insurance Code. Further, the Massachusetts Ins-


82. 211 CMR 35.00.

83. Commissioner's Memorandum of Law in Opposition to Plaintiff's Motion for Summary Judgment and in Support of Defendant's Motion for Summary Judgment at 13, n.5, stated in part that he "does not dispute" the Plaintiff's position that "females of a class have fewer deaths than males as a class at every interval."

84. MASS. ANN. LAWS ch. 175, § 120 and ch. 176D, § 3(7) [Law. Co-op. 1987].

MASS. ANN. LAWS ch. 176D, § 3(7) defines unfair methods of competition and unfair or deceptive acts or practices in the business of insurance.

(7) Unfair discrimination: (a) Making or permitting any unfair discrimination between individuals of the same class and equal expectation of life in the rates charged for any contract of life insurance; ... Similar prohibitions exist for accident or health insurance.
surance Code specifically authorizes separate, gender-based mortal-
ity tables.\textsuperscript{85} The challenged regulation completely ignores these realities by pro-
hibiting the use of any mortality or life expectancy table to group
individuals into separate classes according to sex. The net effect is
to prohibit insurers from using the various separate male and female
mortality tables specifically authorized by Massachusetts law unless
those tables have been “blended” to form a different, new table.
Clearly, Massachusetts’ unisex regulation restricts the statutory
right provided to insurers to discriminate fairly and ignores the Mas-
sachusetts Supreme Judicial Court decree that the “statutory pat-
tern” creating this right is “antithetical to any implication of a right
in the Commissioner to forbid or limit INSURERS’ conduct in this re-
spect.”\textsuperscript{86}

No doubt the commissioner issued the unisex regulation be-
cause he views the Massachusetts Equal Rights Amendment\textsuperscript{87} as a
fundamental public policy that nullifies the risk classification com-
ponents contained in the Massachusetts’ insurance statutes. The
commissioner simply dismissed these conflicting statutory terms as
unconstitutional. Likewise, he ignored the judicial mandate in \textit{Life
Ins. Ass’n of Mass.}. This approach to regulation seriously miscon-
strues the function and authority of an administrative agency. Reg-
ulators simply do not have the authority—regardless of the depth
of their convictions—to take action contrary to the terms of a statute
that they administer on the grounds that they personally consider
the statute to be unconstitutional or bad public policy. Such action
misunderstands the constitutional process and violates the separa-
tion of powers among the three branches of government that forms
our very system of government.

\textsuperscript{85} See Mass. Ann. Laws ch. 175, § 144(h).
\textsuperscript{87} Article 1 of the Massachusetts Declaration of Rights (the “ERA”) states in
part that “Equality under the law shall not be denied or abridged because of sex . . . .” In
\textit{Life Ins. Ass’n of Mass. v. Comm’ry of Ins.}, the Massachusetts Supreme Judicial
Court stated that:

\begin{quote}
Persons with AIDS or having HIV antibodies are not in a classification
protected against discrimination by the State Constitution (see art. 1 of
the Declaration of Rights), and thus we are not presented here with the
question of the commissioner’s authority to enforce constitutional pro-
tections by regulation, even in the absence of statutory authority.
\end{quote}
These concerns alone should be sufficient reason for a commissioner to seek an alternative method to clarify the statute as he is sworn to administer (e.g., either through legislative amendment or through a declaratory judgment action). However, as noted elsewhere in this article, the existence of compelling medical data (which concludes that the mortality and morbidity differences between the sexes are reasonably and genuinely based on physical characteristics unique to one sex) should eliminate any need for a commissioner to seek such clarification.

Montana

The Montana experiment in unisex is most revealing in this regard. Montana is the only state to have imposed legislatively unisex rates on all lines of insurance.78 The insurance industry has launched numerous efforts to repeal the Montana unisex statute. The effort that met with the most success occurred in 1987 when Montana H.B. 519 passed both houses of the Legislature. H.B. 519 would have permitted insurers to charge sex-based rates "when bona fide statistical differences in risk or exposure have been substantiated."79

Then-Governor Ted Schwindinger reluctantly vetoed this legislation, based on his "intentuous assumption that such veto was mandated by Article II, Section 4 of the Montana Constitution."80 Governor Schwindinger's veto message expressed his discomfort with the unisex statute and noted "[t]he evidence is clear and conclusive—


90. Zimmerman, supra note 86, at 430.

91. This section, referred to selectively as the "Individual Oligarchy Clause," states that:

[PRIVATE PERSON SHALL BE DENIED THE EQUAL PROTECTION OF THE LAWS. NORTHERN STATE OR ANY PERSON, EQUITY, CORPORATION OR INSTITUTION SHALL DISCRIMINATE AGAINST ANY PERSON IN THE EXERCISE OF HIS CIVIL OR POLITICAL RIGHTS ON ACCOUNT OF RACE, COLOR, SEX, CULTURE, SOCIAL ORIGIN OR CONDITION, OR POLITICAL OR RELIGIOUS IDEAS.]

"[No person shall be denied the equal protection of the law. Neither the State nor any person, firm, corporation or institution shall discriminate against any person in the exercise of his civil or political rights on account of race, color, sex, culture, social origin or condition, or political or religious ideas."
statutory implementation of non-gender insurance in 1985 has significantly increased the cost of insurance for many women.92

A Montana Insurance Department unisex survey, although prepared in opposition to H.B. 519, nevertheless revealed that term life and whole life insurance premiums for a 30-year-old female increased up to 110 per cent and 54 per cent, respectively, while individual automobile insurance premiums for a 20-year-old female increased between 4 per cent and 91 per cent.93

Pennsylvania

Uncontested medical testimony submitted by ACLU and others94 in a Dec. 4, 1989, administrative hearing before the Pennsylvania Insurance Department on that state's proposed regulation supported this same conclusion.

If the differing life expectancies of the sexes and the detrimental economic impact of unisex insurance rates on women for certain coverages are well recognized, why then do regulators attempt to impose such rates on the public? Bartholomew v. Foster95 questioned whether automobile insurance rates for a young male driver, based in part on sex (and which were considerably higher than rates for a similarly situated female driver) were lawful under Pennsylvania's Equal Rights Amendment ("ERA").96 When reviewing the types of discrimination prohibited by the ERA, the Court in Bartholomew noted that gender-based discrimination is permitted when "reasonably and genuinely based on physical characteristics unique to one sex."97 Applying this standard, the court held that Section 3(2) of Pennsylvania's Casualty and Surety Rate Regulation Act98 violated the ERA, because the ability to operate a motor vehicle safely was not causally connected with a physical characteristic unique to either sex.99

92. Zimmerman, supra, Note 81, at 421.
93. (id. at 431). The survey also concluded that health insurance premiums for individual major medical coverage for a 25-year-old female decreased between 8%–28%.
98. 40 P.S. § 1163.
99. 541 A.2d at 397.
Shortly after the Commonwealth Court issued its decision in *Bartholomew*, the Pennsylvania Insurance Commissioner announced by press release that gender-based rates "clearly violate the State's Equal Rights Amendment," that the Department interpreted *Bartholomew* to cover all lines of insurance, and therefore that "sex can no longer be used as a rating factor for any kind of coverage." The Department then floated in February, 1989, an exposure draft of a unisex regulation.

Under the test articulated in *Fischer* and quoted approvingly in *Bartholomew*, determining whether gender-based distinctions in life and health insurance pass constitutional muster requires addressing not only serious actuarial and economic concerns, but highly technical, physiological, epidemiological, and biological issues.

ACLI and others felt that the proposed regulation had not seriously addressed these issues. Accordingly, they filed an administrative petition with the Pennsylvania Insurance Department as is permitted by law and requested that the proposed unisex regulation be subject to a full investigatory hearing. Such an investigatory hearing would, of necessity, be more elaborate than the typical one-dimensional "public comment" hearings usually associated with regulations (e.g., hearings in which statements are received without the opportunity for critical analysis). It would have included appropriate provisions for discovery, submission of pre-filed testimony, cross-examination of witnesses, and submission of proposed legal findings and conclusions. On Sept. 15, 1989, Insurance Commissioner Foster by written order denied the administrative petition as being premature, describing the request as "forum shopping by nervous regulators." 100

In December, 1989, the commissioner held a hearing on her proposed unisex regulation. Recognizing the scientific focus of the tests enunciated in *Fischer*, the industry offered massive, and uncontested medical evidence that attested that differences in male and female rates of mortality and morbidity are influenced profoundly

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101. Commissioner's Order at 4. The industry appealed the Commissioner's denial to the Commonwealth Court and also filed, in a separate legal action, a Petition for "Declaratory Judgement" regarding the Commissioner's apparent determination to prohibit the use of gender in the underwriting and pricing of life and health insurance. On Sept. 10, 1990, the Commonwealth Court dismissed, on procedural grounds only, these two lawsuits as not being ripe for judicial review.
by biological and physiological characteristics unique to the sexes—evidence that significantly buttressed the actuarial arguments offered previously to support sex-based rating of insurance. A summary of some of the expert scientific witness testimony is provided in the text and accompanying footnotes.

Deborah Wingard, an Associate Professor of Epidemiology at the University of California at San Diego, testified that females live longer than males in virtually every part of the world—and at every age, including ages where behaviors do not differ by sex. She concluded that known behavioral risks alone do not account for differences in mortality between the sexes.

Instead, both biological and behavioral risk factors influence mortality risks and the sex differential in mortality. Dr. Wingard's research indicated that the female tendency to live longer than men is not lost when women work outside the home. Female deaths from coronary heart disease and all other causes have continued to decline even though women working outside the home tend to smoke more cigarettes and to exhibit more aggressive behavior than women who remain at home.

Dr. Wingard concluded that differences between men and women in mortality and morbidity rates are not wholly explained by behavioral factors. She noted that a number of researchers have concluded that the difference is based on genetic differences between men and women; that is, males have one Y and one X chromosome, while females have a pair of X chromosomes—which probably accounts for males' greater vulnerability to X-linked recessive disorders.

[102] She holds a doctoral degree in Epidemiology and has published extensively about gender differences in mortality and morbidity risks.


For example, data for third-trimester fetuses have consistently shown that males are more prone to spontaneous abortions than females. Wingard Affidavit, ¶ 8.

Male infants die younger than female infants during the first year of life for all major causes of death. Wingard Affidavit, ¶ 7. And females have lower overall mortality rates from virtually all causes, including the 10 leading causes of death in the United States. Wingard Affidavit, ¶ 8.

Other studies by Dr. Wingard that were presented with her affidavit found that when the effects of 16 known demographic, social, and health-behavioral risk factors were mathematically eliminated, mortality differences by sex remain the same (or increase slightly). Wingard Affidavit, ¶ 10.

such as hemophilia. Or, to phrase the conclusion differently, it appears that where chromosomes are concerned, males—not females—are the fairer sex. The differences are related to physiological characteristics unique to the sexes, alone or interacting with behavioral factors.105 Dr. Peter Ramwell, a Professor of Physiology and Biophysics at Washington’s Georgetown University Medical Center, discussed the physiological distinctions between the sexes, testifying that these distinctions have a definite impact on mortality and morbidity, particularly with respect to cardiovascular disease—the leading cause of death in the industrialized world.107

Like Dr. Wingard, Dr. Ramwell concluded that physiological differences between the sexes have a significant impact on gender differences.108

Neither the Pennsylvania Insurance Department nor the proponents of the unisex regulation offered any evidence at the December, 1989, administrative hearing to contradict expert testimony. The proposed unisex regulation remains pending at the administrative level.

Maryland This issue was recently placed before the Maryland Insurance Commissioner. Equitable Life Assurance Society of the United States v. Maryland Commission on Human Relations109 involves allegations by the Commission on Human Relations ("CHR") that The Equitable engaged in unlawful discrimination through the use of sex-based insurance rates, and by establishing occupational criteria and income requirements for disability income plans that had a disparate impact on blacks and women. The CHR alleged that The Equitable also committed sex discrimination by excluding pregnancy from coverage under its disability income plans. The Maryland insurance code permits an insurer to apply differential ratings, premium payments, dividends, or terms and conditions to an insur-

105. Wingard Affidavit, ¶ 10 (citing Waldron) & ¶ 25 passim.
106. Dr. Ramwell holds a doctoral degree in physiology and has specialized in research pertaining to cardiovascular and pathophysiology.
107. For example, women metabolize fat much better than men. Dr. Ramwell concluded that this reflects the need to provide glucose to fetuses. Such improved metabolism of fat in pregnancy is associated with high estrogen levels. Because of increased estrogen levels, women have a lower incidence of death from heart disease than men. Ramwell Affidavit, ¶ 1–4.
108. Ramwell Affidavit, part III.
ance contract, based on the applicant's or policyholder's sex, where there is actuarial justification for such treatment.\textsuperscript{110} CHR concluded that this dispute should be resolved under Maryland's Public Accommodations Statute (Article 49B), rather than the Insurance Code (Article 48A). CHR interpreted the provisions of Article 49B to require an insurer to demonstrate not merely "actuarial justification," but "business necessity" to justify distinctions in rates and coverages based on gender.\textsuperscript{111}

On appeal, the Circuit Court for Baltimore City concluded that the Maryland General Assembly intended to place jurisdiction regarding sex discrimination charges in insurance with the insurance commissioner, though it provided the CHR and the commissioner with concurrent jurisdiction over race discrimination charges.\textsuperscript{112} In the interest of judicial economy, the trial court transferred the entire proceeding to the insurance commissioner and instructed him to consider the Maryland Insurance Code (Article 48A), the Maryland Public Accommodations Statute (Article 49B), and the Maryland Equal Rights Amendment, when he determined the legitimacy of Equitable's practices. That decision has not yet been issued.

\textit{Rate Regulation of Life Insurance}

\textit{Omega Nat. Ins. Co. v. Marquardt}\textsuperscript{113} involves a challenge to Washington Administrative WAC 284-23-550, which requires life insurers to pay death benefits at least equal to 10 years' premium plus compound interest of five percent yearly on most individual life policies with a level death benefit of less than $25,000.\textsuperscript{114} The rule sets a ceiling on premium rates for life insurance policies within its scope of $75.72 per year for $1,000 of level death benefit.\textsuperscript{115} The

\begin{itemize}
\item[113] 799 P.2d 258 (Wash. 1990).
\item[114] American Council of Life Insurance v. Marquardt is a companion case that also challenged the Washington rule. These two cases were consolidated before the trial court, and both were appealed to the Washington Supreme Court.
\item[115] Wash. Ass'n. Cos. § 284-23-550 entitled "Relationship of Death Benefits to Premiums—Unfair Practice Defined." The rule could apply conceptually to other types of life insurance also, e.g., mortgage reduction insurance and credit life insurance.
\item[115] This amount paid at the beginning of each year will accumulate to $1,000 at the end of 10 years, assuming 5% interest. This premium cap does not allow for varying level of rates, expenses of operation and servicing, or profit.
\end{itemize}
Washington Insurance Commissioner conceded that he had no authority to regulate life insurance rates and did not dispute that the rule placed a ceiling on life insurance premiums. His justification for the rule was that it was a method to prevent unfair or deceptive practices from being committed against a particular segment of the public (i.e., the elderly).

In January, 1989, after approving the rule, the insurance department issued a letter that stated the principal reasons for its adoption. In that letter, the chief deputy insurance commissioner claimed that the commissioner had "received a steady trickle of complaints from seniors . . . " about insurance policies whose death benefits were, after a period of years, less than the total premiums paid. In his correspondence, the deputy commissioners (the principal architect of the rule) stated that its purpose was to prohibit the sale of small insurance policies issued at older ages whose "unless the policyholder dies within a small window in time, the premium will be more than the benefit." He described this result as "unfair" even though it admittedly resulted from a combination of "the necessarily high charges and the heavy expense loadings" associated with the sale of small amounts of insurance coverage to elderly insureds.

ACLI and several insurers filed suit in March, 1989, challenging the rule. Although the trial court found that insurers would be substantially harmed when the rule took effect, it denied the industry's motion for a preliminary injunction, and the rule was held valid.117

Because of the important public policy considerations raised by this litigation, the Washington Supreme Court granted direct review, bypassing the intermediate state appellate court. On Oct. 25, 1990, the Washington Supreme Court ruled unanimously that the regulation was valid, because the rule was primarily a consumer protection measure and not designed to affect life insurance rates substantially. The court stated that:118

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115. Many of these same statements were repeated by him in an affidavit submitted to the trial court. The affidavit also described four specific complaints; these complaints formed the sole basis for the rule.

116. The trial court refused to issue a preliminary injunction, because it believed that the insurance industry did not have a reasonable likelihood of success on the merits. Trial Court Order at 11, 25, 27, 35 (Dist. Ct. 1989).

117. 790 P.2d at 340. The court emphasized consumer protection concerns, stating that the litigation essentially involves the Commissioner's power and the tools available to him to protect the insurance-buying public from insurance products.
The Commissioner's lack of statutory authority to engage in detailed comprehensive rate-making for life insurance policies does not undermine the power given him . . . to define and prohibit specific unfair or deceptive acts or practices even when such rules may have an incidental impact on rates.

The court, observing that it was not the judiciary's role to second guess "the wisdom or desirability" of an administrative rule, noted that the rule was afforded a "particularly heavy presumption of constitutionality" because it constituted economic regulation and concluded that the rule was constitutional.

It is important to note that the principal statute that the insurance commissioner relied upon in adopting the rule permits the insurance commissioner to define by regulation additional acts or practices as being "unfair or deceptive" other than those found in Washington's unfair trade practices act. Since only three other states (Utah, Wisconsin, and Texas) are known to have such a provision in their unfair trade practices acts, the precedential value of this decision is limited.

Curiously, the Washington Supreme Court never considered in its opinion the risk classification principles raised by the industry, nor did it even acknowledge that such concerns were raised as issues in the case.

Consistent with the risk classification principles set forth in the first portion of this article, the life insurance industry argued that the rule violated the Washington law that 1) requires insurers to classify risks fairly and 2) prohibits unfair discrimination among classes. This fundamental principle is found in Washington Insur-

which are unfair or deceptive. In order to protect the insurance-buying public, . . . courts must afford considerable deference to the Commission-
er's expertise in defining unfair insurance policies or practices.

119. Id. at 241, 242, passim.

120. Wash. Rev. Code § 48.80.010(2) provides that "... the Commission may from time to time ... define other methods of competition and other acts and prac-
tices in the conduct of such business reasonably found by him to be unfair or decept-
tive:"

121. In addition, the industry raised important state and federal constitutional issues that relate to insurers’ constitutional rights to an opportunity to earn a reason-
able return (WASH. CONST. Article 1, §§ 3 and 4) and due process issues under U.S. CONST. Amendments 5 and 14.

122. WASH. REV. CODE § 48.16.060 specifically provides that its unfair discrim-
ation provisions do not prohibit fair discrimination by a life insurer as between individuals having unequal expectation of life.
ance Code Sections 48.18.480 and 48.30.300. Section 48.18.480 prohibits discrimination between those having "substantially like insuring risks, and exposure factors, and expense elements" but does not "prohibit fait discrimination by a life insurer as between individuals having unequal expectation of life [emphasis added]." Section 48.30.300 prohibits discrimination on the basis of sex, marital status, or sensory, mental, or physical handicap except where bona fide differences in risk or exposure have been substantiated.

The Washington Insurance Commissioner had previously recognized and approved of these risk classification principles by incorporating them into earlier rules—including a rule addressing high-risk individuals infected with the AIDS virus.120 Inexplicably, he failed to apply these same principles to another class of high-risk insureds—the elderly. There is no concuprisual distinction to justify selectively applying risk classification principles to these two identifiable groups of individuals that represent extremely high mortality and morbidity risks. Clearly, the commissioner must have exercised a social policy judgment regarding which class of high risk insureds should obtain low-cost insurance through application of accepted risk classification principles and which class should not.

This inconsistency does not end the story in this litigation. Both the American Association of Retired Persons ("AARP") and the National Association of Insurance Commissioners ("NAIC") filed separate amicus briefs with the Washington Supreme Court to support the rule.121 AARP's position was not unexpected, given that the AARP is an organization unfamiliar with risk classification principles. The AARP asserted an "anti-age" argument; i.e., "age is not a factor in a person's right to make decisions affecting his or her life," and implied that use of "age" as an underwriting criterion constituted "age discrimination."122 What was unexpected was the NAIC's position about risk classification, solvency, and insurance marketing issues. With regard to solvency and risk classification, the NAIC

120 Wash. Admin. Code § 284-84-100(2)(b) (prohibits insurers from having one class of insureds supporting, or being supported by, another class). See, additionally, Wash. Admin. Code § 284-90-001(2)(e)(i) (statement of risk classification principle to be applied to individuals infected with the AIDS virus).
121 The American Academy of Actuaries filed an amicus brief on behalf of the life insurance industry in opposition to the rule.
122 AARP Brief at 1, 7.
brief stated that "...a premium may be actuarially sound, but when compared to the benefit to be paid, grossly unfair." NAIC, like the insurance commissioner, has apparently rejected the principles of risk classification and actuarially sound premium rates and, instead, focused on a regulator's sense of what is "fair" when determining what is permissible under a state's insurance code. This failure to consider mortality and morbidity factors (in addition to insurers' acquisition costs and profit) is surprising, given the great lengths that the NAIC has gone to in proclaiming publicly its emphasis on insurer solvency. It is unsettling at best for the NAIC to emphasize solvency as its "top priority" and, during the same year, to support a regulation that prohibits insurers from charging admittedly actuarially sound premium rates for certain life insurance products. This inconsistency is inexplicable.

The NAIC stated its analysis of what is a "fair" premium:

In determining if the sale of such a product is ultimately "fair" to consumers it is necessary to judge whether the benefit expected to be derived bears a reasonable relationship to the cost to consumers...[T]he cost to other members of the group, however, must be judged in comparison to the benefits which only some will derive.

Consider the ramifications of the NAIC "test" for determining a "fair" premium. If an insured in a class outlives his life expectancy, it is apparently the premiums-to-benefit ratio of that longer-lived insured that is to be used to determine whether the premium of the entire class is excessive.

126. NAIC Brief at 10.
127. See The NAIC News, (Dec., 1989) stating "NAIC declares insurer priority in 1990 to be solvency." The emphasis on solvency as a priority is not surprising, given that there are 300 insurer companies currently in liquidation or rehabilitation proceedings. [See NAIC, Rehabilitators and Liquidators (EM) Task Force, NAIC Contact Person Report: Status of Massachusetts Insurance Company Departmental Supervisions, Conservatorship, Rehabilitation, and Liquidations (Dec., 1990).] During the period from 1984 to November 1990, a record number of 139 life and health insurance companies (ceiling and assumption) were placed in rehabilitation proceedings. [See National Organization of Life and Health Insurance Guaranty Associations, Life and Health Insurance Company Insolvencies and Impairments, 1975—November, 1990, pp. 3–8 (Dec. 11, 1990).] There is no assurance that this experience will not continue.
128. NAIC Brief at 14–15.
The NAIC shows a similar lack of knowledge about the purpose and marketing of insurance products. Their brief states that "All life insurance policies must be considered as an investment and they certainly are marketed as such." In fact, the differences between life insurance and investments are so clear as not to require substantial discussion. Insurance provides instant coverage for the face amount of the policy, regardless of the premium paid. A savings account (the investment used by the Washington Insurance Department in its comparison to life insurance) provides no death benefit, and its value is only the aggregate amount of monies deposited plus the interest. Obviouly, an individual life insurance policy is an asset that may increase in value, but its primary function is to furnish instant protection, not to guarantee a rate-of-return on the premiums paid (as measured by comparisons to death benefits or to cash values attributable under the policy).

Conclusion

The author has been involved in insurance regulation for more than 11 years. He has spent most of that time as a state insurance regulator, and thus, is extremely sympathetic to the concerns and responsibilities of state regulators. The public's interest and protection must always be of uppermost concern to regulators alike.

Yet, a commissioner's view of social morality should not override actuarially sound treatment of mortality or morbidity. A court should not permit the rule of law to devolve into law by rule. Efforts by commissioners to impose their personal notion of insurance fairness should be rejected where those efforts run counter to fundamental insurance principles incorporated into a state's insurance code.

129. NAIC Brief at 17, 18.
130. As Chief Counsel for the Alabama Insurance Department (1980-86), he was responsible for litigation that defended the state's differential premium tax laws, efforts to liquidate numerous insurers, and prosecution of white collar criminals.
Actuarial Pricing and Insurance Markets

Introduction


For most of the insurance industry’s history in the U.S. investment income was not explicitly factored into ratemaking. Insurance company management and investors knew full well that holding premium and claim reserves was a value to the insurer. They probably understood that the worth of assets amassed through the underwriting process grew or shrunk with their investment yields. In a static world, however, with little change in interest rates, investment practices, or the payout pattern for releasing reserves, the nature of this relationship could be approximated. The traditional factors for "profit and contingency" for each line of business (3.5 to 2.5 percent) worked well enough.

Clearly, though, investment yields affected insurer underwriting and rating. As yields increased from investments the “banking end of the business” became more important. The growth in the volume of long tail lines increased the pool of investable funds. On the financial side of the insurance management there was the increasingly venturesome nature of investment practices. Insurers were diversifying into more risky and higher yielding assets.

Professor Webb’s long career as a teacher and actuary spans the period of benign neglect of investment income through the regulatory demand for quantification and incorporation of investment yields into rate making. He notes that the value of investment income was not a controversy until states undertook to regulate rates
in a serious way. As Griffin, Jones, and Smith note, the time value of money became a natural preoccupation of regulators. Prof. Webb’s vision was clear enough to identify the issues that would embroil the industry for the next several decades.

Investment Income in Insurance Ratemaking

Bernard L. Webb

The last two decades have seen interest rates move rapidly upward, with only an occasional pause or slight decline. As shown by Table 1, the average yield on high grade state and local government bonds rose from 3.26 percent in 1960 to 7.84 percent in 1980. Since bonds

<table>
<thead>
<tr>
<th>Year</th>
<th>AAA State and Local Government Bonds</th>
<th>AAA Corporate Bonds</th>
<th>U.S. Treasury 20-Year Bonds</th>
<th>3-Month Treasury Bills</th>
<th>3-Month Finance Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>3.26</td>
<td>4.41</td>
<td>4.06</td>
<td>2.87</td>
<td>3.54</td>
</tr>
<tr>
<td>1965</td>
<td>3.16</td>
<td>4.49</td>
<td>4.27</td>
<td>3.95</td>
<td>4.21</td>
</tr>
<tr>
<td>1975</td>
<td>6.42</td>
<td>8.83</td>
<td>8.19</td>
<td>5.77</td>
<td>6.15</td>
</tr>
</tbody>
</table>

are the principal investment medium for property-liability insurers, increasing interest rates mean increasing investment income.

But rising interest rates are not the only reason that insurers have been reaping a bumper crop of investment income. As shown by Table 2, there has been a rapid change in the mix of coverages written by property-liability insurers. The third-party lines account for a substantially larger proportion of the industry’s premium volume than in the past. As shown in Table 2, the three major third-party lines accounted for 48.6 percent of the industry’s total premium volume in 1980, as opposed to 29.3 percent in 1955. In actuality, Table 2 understates the growth in the third-party lines by a significant, but unknown, amount. Multiple peril insurance, which includes a substantial amount of liability coverage, increased from $269,139,000, or 22 percent of total premiums, in 1957 to $17,261,346,000, or 18.1 percent of total premiums in 1980.

The long delay between loss occurrence and claim payment in the third-party lines permits insurers to earn substantially more investment income than would be earned on an equivalent volume of first-party insurance premiums. Table 3 shows the earned premiums and reserves for losses and loss expenses for all lines for companies writing most of the property-liability insurance in the United States. The increasing percentage of third-party premiums caused the ratio

### TABLE 2
Product Line Mix
Property Liability Insurers* 1955–1980

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Net Premiums</th>
<th>Auto Liability</th>
<th>General Liability</th>
<th>Workers' Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Lines</td>
<td>Amount</td>
<td>%</td>
<td>Amount</td>
</tr>
<tr>
<td>1955</td>
<td>$10,539,326</td>
<td>$2,495,020</td>
<td>23.7</td>
<td>$607,596</td>
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<tr>
<td>1960</td>
<td>14,972,631</td>
<td>3,882,917</td>
<td>25.9</td>
<td>962,831</td>
</tr>
<tr>
<td>1965</td>
<td>20,063,468</td>
<td>5,423,674</td>
<td>27.0</td>
<td>1,136,745</td>
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<tr>
<td>1970</td>
<td>32,867,026</td>
<td>8,958,243</td>
<td>27.3</td>
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<tr>
<td>1975</td>
<td>49,966,565</td>
<td>13,314,695</td>
<td>26.6</td>
<td>4,876,096</td>
</tr>
<tr>
<td>1980</td>
<td>95,579,549</td>
<td>23,319,296</td>
<td>24.3</td>
<td>8,967,877</td>
</tr>
</tbody>
</table>

*Sources: Insurance Facts. [New York: Insurance Information Institute], various annual editions.
TABLE 3  
Relationship of Loss Reserves to Earned Premiums  
Selected Companies  
Years 1966 to 1980*

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Companies</th>
<th>Earned Premiums</th>
<th>Loss and Exp. Reserves</th>
<th>Ratio of Reserves to Earned Premiums</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>1575</td>
<td>93,850,137,589</td>
<td>92,451,847,894</td>
<td>0.985</td>
</tr>
<tr>
<td>1979</td>
<td>1440</td>
<td>86,959,718,581</td>
<td>81,113,248,584</td>
<td>0.933</td>
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<tr>
<td>1978</td>
<td>1400</td>
<td>78,746,968,331</td>
<td>68,766,679,122</td>
<td>0.873</td>
</tr>
<tr>
<td>1977</td>
<td>1353</td>
<td>68,870,260,263</td>
<td>56,969,812,318</td>
<td>0.827</td>
</tr>
<tr>
<td>1976</td>
<td>1327</td>
<td>57,178,286,316</td>
<td>47,105,354,181</td>
<td>0.824</td>
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<tr>
<td>1975</td>
<td>1285</td>
<td>47,844,413,596</td>
<td>39,477,493,019</td>
<td>0.825</td>
</tr>
<tr>
<td>1974</td>
<td>1303</td>
<td>43,736,101,028</td>
<td>34,574,288,270</td>
<td>0.793</td>
</tr>
<tr>
<td>1973</td>
<td>1300</td>
<td>40,892,726,056</td>
<td>30,893,729,748</td>
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<tr>
<td>1972</td>
<td>1264</td>
<td>37,002,056,637</td>
<td>26,608,651,934</td>
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<tr>
<td>1971</td>
<td>1212</td>
<td>33,920,245,442</td>
<td>22,927,298,752</td>
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<tr>
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<tr>
<td>1969</td>
<td>1212</td>
<td>27,711,018,422</td>
<td>18,027,061,115</td>
<td>0.651</td>
</tr>
<tr>
<td>1968</td>
<td>1205</td>
<td>24,887,834,098</td>
<td>15,746,531,118</td>
<td>0.633</td>
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<tr>
<td>1967</td>
<td>1197</td>
<td>22,016,850,869</td>
<td>13,987,140,831</td>
<td>0.613</td>
</tr>
<tr>
<td>1966</td>
<td>1220</td>
<td>21,031,845,184</td>
<td>12,536,835,766</td>
<td>0.596</td>
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</table>

*Source: Best's Aggregates and Averages, (Oldwick, N.J.: A.M. Best Company, Inc.), various annual editions and pages.

of loss reserves to earned premiums to increase from 59.6 percent in 1966 to 98.5 percent in 1980.

The combined effect of the increase in interest rates and loss reserves can be seen in Table 4. Investment income increased from 7.4 percent of earned premiums in 1966 to 12.4 percent of earned premiums in 1980. This surge in investment income has rekindled a controversy that has flared periodically since at least 1919, the controversy regarding the role of investment income in ratemaking.

History of the Controversy

The treatment of investment income in ratemaking did not become an issue until the states undertook detailed regulation of insurance
<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Companies</th>
<th>Underwriting Gain</th>
<th>Investment Gain**</th>
<th>Ratio of Investment Gain to EP</th>
<th>Ratio of Net Written Premiums to Policyholders' Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>1578</td>
<td>-1,712,423,071</td>
<td>11,596,118,401</td>
<td>0.124</td>
<td>0.245</td>
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<td>2,548,142,724</td>
<td>7,346,097,200</td>
<td>0.288</td>
<td>0.227</td>
</tr>
<tr>
<td>1977</td>
<td>1353</td>
<td>1,926,315,435</td>
<td>6,145,130,297</td>
<td>0.228</td>
<td>2,471</td>
</tr>
<tr>
<td>1976</td>
<td>1327</td>
<td>-1,558,551,291</td>
<td>5,092,604,736</td>
<td>0.089</td>
<td>0.181</td>
</tr>
<tr>
<td>1975</td>
<td>1285</td>
<td>-3,593,959,332</td>
<td>4,294,370,246</td>
<td>0.090</td>
<td>0.188</td>
</tr>
<tr>
<td>1974</td>
<td>1303</td>
<td>-1,981,371,405</td>
<td>3,679,091,145</td>
<td>0.084</td>
<td>0.156</td>
</tr>
<tr>
<td>1973</td>
<td>1300</td>
<td>791,761,321</td>
<td>3,756,289,301</td>
<td>0.092</td>
<td>0.134</td>
</tr>
<tr>
<td>1972</td>
<td>1264</td>
<td>7,797,933,614</td>
<td>3,100,907,299</td>
<td>0.225</td>
<td>0.124</td>
</tr>
<tr>
<td>1971</td>
<td>1212</td>
<td>1,391,000,492</td>
<td>2,618,163,544</td>
<td>0.195</td>
<td>0.129</td>
</tr>
<tr>
<td>1970</td>
<td>1209</td>
<td>77,776,245</td>
<td>2,156,013,086</td>
<td>0.069</td>
<td>0.122</td>
</tr>
<tr>
<td>1969</td>
<td>1212</td>
<td>-529,899,190</td>
<td>2,403,343,935</td>
<td>0.173</td>
<td>1.794</td>
</tr>
<tr>
<td>1968</td>
<td>1205</td>
<td>-148,123,790</td>
<td>1,928,701,069</td>
<td>0.077</td>
<td>0.108</td>
</tr>
<tr>
<td>1967</td>
<td>1197</td>
<td>193,651,824</td>
<td>1,411,594,380</td>
<td>0.066</td>
<td>0.094</td>
</tr>
<tr>
<td>1966</td>
<td>1220</td>
<td>386,928,445</td>
<td>1,565,946,032</td>
<td>0.074</td>
<td>0.099</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td></td>
<td>-2,959,546,525</td>
<td>66,774,065,296</td>
<td></td>
<td></td>
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</tbody>
</table>
rates. However, the controversy over investment income and detailed rateregulation seem to have appeared almost simultaneously.

The 1921 Standard Profit Formula

In 1919, when detailed regulation of insurance rates was still in its infancy, Commissioner Bruce T. Bullion of Arkansas, introduced a resolution instructing the Fire Insurance Committee of the National Convention of Insurance Commissioners (NCIC) to investigate several aspects of fire insurance ratemaking. One subject for investigation was:

Whether any items of profit or loss connected with the so-called banking end of the business should be properly taken into consideration [in the regulation of fire insurance rates].

The "so-called banking end of the business" referred to insurers' investment operations. The Fire Insurance Committee continued its study for two years, with the National Board of Fire Underwriters (NBFU) vigorously opposing the inclusion of investment income in the ratemaking process.

At the NCIC meeting in 1921, the majority of the Fire Insurance Committee submitted its report, which stated in part, that "no part of the so-called banking profit [or loss] should be considered in arriving at the underwriting profit [or loss]." The majority report also provided for an underwriting profit allowance of 5 percent of premiums plus a catastrophe allowance of 3 percent of premiums.

Commissioner Bullion filed a minority report objecting to several recommendations of the majority report, including, indirectly, the treatment of investment income. However, the majority report was approved and has come down in the history of insurance regulation as the 1921 standard profit formula. The NCIC did not record its reasons for adopting the 5 percent underwriting factor. The only explanation that survives is a statement by the NBFU that:

An equitable regard for the investors who furnish the capital for this particularly hazardous business would indicate that 5% is the minimum percentage which can be regarded as "a reasonable underwriting profit." This has already been recognized as equitable by several states.
The NBFU also recorded the arguments it used to defeat the consideration of investment in rate regulation. They were:

1. Because the interest rate to holders of policies written on the term plan—the great backbone of unearned premium liability—has been already discounted by concessions of two and a half premiums for three [years] and four premiums for five years.

2. It is setting up an entirely new principle in underwriting calculations, that companies should not admit is legal and which may lead to untold complications in the future.

3. Because the profits derived from the investment end of the business is not a part of "underwriting."

Reasons:

a. Unearned premium liability is an organization requirement as well as capital and surplus.

b. If reserves are not earned they must be contributed by stockholders or dissolution becomes necessary by statute or discretionary authority.

c. Reserves for companies just starting in business and for companies largely increasing their business are invariably contributed in part from surplus belonging to stockholders.

d. Reserves are contributed from surplus on all business outstanding, unpaid for in the hands of agents.

e. Unearned premium liability is not the property of policyholders; it is a percentage or percentages of all premiums for the protection of policyholders.

f. Unearned premiums may not be segregated into state groups, being for the protection of all policyholders wherever located.

g. Policyholders, by cancellation, do not get their reserve; they get a certain proportion of the premium originally paid, further proving that the reserve itself is not their property.

4. Even though admitted as an expediency, the cost of figuring a percentage on unearned premium liability under any formula that did proper justice to the amenities would cost annually hundreds of thousands of dollars.
Although the 1921 formula applied only to fire insurance, the 5 percent loading for underwriting profit was applied to virtually all lines of property-liability insurance except workers’ compensation.

The McCullough Report

The controversy over investment income seems to have died down shortly after the adoption of the 1921 formula, perhaps because of a sharp drop in interest rates shortly thereafter. The issue did not attract significant attention again until 1946. In that year, the investment income issue resurfaced in the debates associated with the development of the National Association of Insurance Commissioners’ model rate regulatory acts. In 1947, the New York Insurance Department submitted to the National Association of Insurance Commissioners (the successor organization to the NCIC) a voluminous report dealing with insurance industry profitability and the treatment of investment income. The report is usually referred to as The McCullough Report after its principal author Roy C. McCullough, then a Special Assistant in the New York Insurance Department. On October 8, 1947, Thomas C. Merrill, Deputy Superintendent, submitted the Report to New York Superintendent Robert E. Dineen, who was Chairman of the Special Sub-committee of the Fire and Marine Committee of the NAIC.

The McCullough Report included extensive discussion of the role of investment income in insurer profits. McCullough concluded, among other things, that:

The 1921 formula is in error in that it disregards certain investment income having its origin in the underwriting activities of the companies. The amount of this error is large and under present circumstances amounts to about 2½% to 3% of earned premiums. Investment income is intricately interwoven with the underwriting activities of the companies. Apparently, this was recognized by the 1921 Fire Insurance Committee which saw fit to deal with the situation by allowing exclusion of all investment income in return for a reduction in the comission allowance from 5% of earned premiums to 3%. In relating investment income to underwriting profit, consideration of capital gains and losses should be excluded. He recommended that the NAIC develop a revised standard or formula that would provide for:
The inclusion as part of the underwriting profit of that portion of the investment income of the companies which is properly attributable to their underwriting activities.

The investment income "properly attributable to...underwriting activities" is not defined in the recommendation. However, comments elsewhere in the report indicate that McCullough considered it to be the excess of total investment income over the amount that the owners could have earned by investing their money in securities of the type usually held by insurers. This is equivalent to attributing to the policyholders all investment income (except capital gains) on all assets except those counterpart to the policyholders' surplus. Most such assets would be derived from the unearned premium reserve, loss reserves and loss expense reserves.

This recommendation seems to be at odds with McCullough's earlier statement that "the proper test for judging the reasonableness of profits in the insurance business is the rate of return on the equity capital invested in the business." Return on equity capital would include all investment income from all sources.

The exclusion of capital gains also could create a problem. Such an exclusion could encourage insurers to invest more heavily in common stocks in order to maximize capital gains. However, this could reduce the amount of investment income attributable to stockholders, since the dividend income from stocks frequently is lower than the interest income from an equivalent amount invested in bonds.

The National Board of Fire Underwriters attacked The McCullough Report with substantially the same arguments used against Commissioner Bullion's proposal in 1919. In a 126 page statement, accompanied by numerous exhibits, the Committee on Laws of the NBFU concluded:

This memorandum has shown that a formula for rate making should not be geared to rates of investment yield in a money market, and that rates of investment yield have no relationship to premium rates, that interest rates govern the use of money, that premium rates govern exposure to loss by fire and other perils, and that these unrelated subject matters cannot and should not be united into a formula for fire insurance rate making that one of the best proofs of this lost statement is McCullough's own effort to devise a formula, which would attempt to weigh into rates some
portion of investment income. This memorandum has demonstrated how totally unworkable is such a formula, how certainly confiscatory, and how prejudicial it would be in operation to certain types of companies.\(^{13}\)

Although the statement fell somewhat short of the proof it claimed, the views of the NBFU prevailed as they had in 1921.

Considered as a whole, the McCullough Report was a thorough exploration of the role of investment income in fire insurance rate-making, certainly the most thorough up to that time. However, most of its recommendations were ignored.

The Arthur D. Little Studies

After The McCullough Report was laid to rest, the investment income controversy lapsed into another two decades of dormancy. It came to life again in the 1960s as interest rates again began to rise. The first major salvo in the revived battle was a report prepared by Arthur D. Little, Inc. on behalf of the American Insurance Association (AIA), a successor organization to the National Board of Fire Underwriters.\(^{14}\)

The Arthur D. Little (ADL) study represented quite a departure from the position taken by NBFU and from the position taken more recently by AIA. The NBFU's position, and the position of most of the remainder of the industry, was that the industry's underwriting operation should stand on its own and be judged by underwriting profit with investment operations being entirely separate. The ADL study took the position that:

> We have examined the question of investment income in the property and liability insurance industry from the point of view of total profits to the industry, having found the traditional arguments about asset and reserve ownership questions unpersuasive as a list of inquiry in this matter. Arguments based on ownership of reserves to decide treatment of investment income. It is, therefore, believed more appropriate to consider the total industry profits—underwriting and investment—and to test this total against appropriate standards of comparison.\(^{15}\)

Having reached the foregoing decision, ADL proceeded to test insurance industry profits against profits of other industries of sim-
ilar risk. The concept of a direct relationship between risk and the rate of return is consistent not only with economic theory, but also with the law of the land as established by the United States Supreme Court. In a case involving ratemaking for a gas utility, the Court ruled that:

The rate-making process under the Act, i.e., the fixing of "just and reasonable" rates, involves a balancing of the investor and the consumer interests . . . . The investor interest has a legitimate concern with the financial integrity of the company whose rates are being regulated. From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock . . . . By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.24

The application of the Court's rule to the insurance industry leaves at least four major decisions to be made: first, the sources of revenue to be considered; second, the base against which the rate of return will be calculated; third, the form of the relationship between risk and return; and, fourth, the measure of risk to be used. General agreement has not yet been achieved with regard to any of the four basic decisions.

Revenue Sources

Underwriting income unquestionably should be considered in calculating the rate of return, but there seems to be little agreement beyond that point. Other sources that may be considered are: 1) net investment income (consisting of interest, dividends and similar income, but after deduction of investment expenses), 2) realized capital gains and losses and 3) unrealized capital gains and losses. The ADL study included income from all of the foregoing sources.

Other commentators have suggested that only the investment income from assets counterpart to the loss, loss expense and unearned premium reserves be included in the calculation of the rate
of return as proposed in The McCullough Report. However, ADL chose to use investment gain from all sources including the assets counterpart to the policyholders’ surplus.

At first glance, ADL’s election of this broad definition of return would appear to be beneficial to consumers. However, that is not necessarily the case. As shown in Table 5, unrealized capital gains are substantially more volatile than the other sources. Unrealized capital gains and losses were negative five years out of the fifteen and ranged from a loss of $7.0 billion to a gain of $4.3 billion. Underwriting gain or loss, the other very volatile source, was also negative five years out of fifteen but ranged from a loss of $3.6 billion to a profit of $1.5 billion. Realized capital gains were negative only one year, and net investment income was positive in all years with a steady upward trend. As will be apparent later, including the unrealized capital gains in the ADL formula would justify a higher return than would be realized if they were excluded.

Several bases may be used for calculating a rate of return. The most common ones are: 1) sales, 2) net worth (or policyholders’ surplus), and 3) total assets. The choice among them depends on the purpose for which the rate of return will be used and other circumstances. Some of the major considerations are discussed below.

It is necessary to specify the return on sales in the final stage of the ratemaking process, since the rate is a measure of sales. Also, the return on sales may be a useful measure for the comparison of efficiency of companies in the same industry. However, it is not a useful measure for interindustry comparisons because of differences among industries. Some industries strive for a high volume of sales with a low profit margin, while others operate at low volume with a high margin. The choice between the two approaches is usually dictated by conditions of supply and demand and may be beyond the control of management.

As noted by the U.S. Supreme Court in the Hope Gas case cited above, the purpose of profit is to compensate the equity owners for the use of their capital and to attract and hold adequate capital to support the operations of the firm. Consequently, it would appear that return on net worth or, in insurance terminology, policyholders’ surplus would be a logical measure of adequacy.

The return on net worth has the added advantage of being a generally accepted measure and being readily available for other industries, permitting a ready comparison of insurance industry earnings.
<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Companies</th>
<th>Underwriting Gain</th>
<th>Net Investment Income</th>
<th>Realized Capital Gains</th>
<th>Unrealized Capital Gains</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>1980</td>
<td>1575</td>
<td>-1,712,423.071</td>
<td>11,063,492.131</td>
<td>532,626.270</td>
<td>4,274,228.027</td>
<td>14,157,923.557</td>
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<tr>
<td>1979</td>
<td>1480</td>
<td>23,605.762</td>
<td>9,279,325.043</td>
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<td>2,548,142.724</td>
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<td>412,148.422</td>
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<td>1977</td>
<td>1353</td>
<td>1,926,315.435</td>
<td>5,815,788.033</td>
<td>329,342.264</td>
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<td>6,998,932.527</td>
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<td>1972</td>
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<td>2,835,677.299</td>
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<td>1969</td>
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<td>-15,909.345</td>
<td>-36,929.468</td>
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**TOTALS**

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4,162,478.471
3,438,085.606
69,915,604.377

*Source: Best's Aggregates and Averages. (Oldwick, N.J.: A.M. Best Company, Inc.) various annual editions and pages.*
<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Companies</th>
<th>Policies/holders</th>
<th>Unearned Premiums</th>
<th>Reserve for Loss and Loss Expense</th>
<th>Ratio of Reserve in Policyholders Reserve</th>
</tr>
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<tbody>
<tr>
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<td>1,500</td>
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<td>36,066,500</td>
<td>87,570,688</td>
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<tr>
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<td>52,450,000</td>
<td>36,066,500</td>
<td>87,570,688</td>
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<tr>
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<td>52,450,000</td>
<td>36,066,500</td>
<td>87,570,688</td>
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<td>1,493</td>
<td>52,450,000</td>
<td>36,066,500</td>
<td>87,570,688</td>
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<tr>
<td>1964</td>
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<td>52,450,000</td>
<td>36,066,500</td>
<td>87,570,688</td>
<td>4.14x</td>
</tr>
<tr>
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<td>4.14x</td>
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<tr>
<td>1966</td>
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<td>4.14x</td>
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<tr>
<td>1967</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<td>36,066,500</td>
<td>87,570,688</td>
<td>4.14x</td>
</tr>
<tr>
<td>1976</td>
<td>1,467</td>
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<td>36,066,500</td>
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<tr>
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<tr>
<td>1978</td>
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<td>52,450,000</td>
<td>36,066,500</td>
<td>87,570,688</td>
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<tr>
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<td>1,461</td>
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<tr>
<td>1980</td>
<td>1,459</td>
<td>52,450,000</td>
<td>36,066,500</td>
<td>87,570,688</td>
<td>4.14x</td>
</tr>
</tbody>
</table>

*Source: Reinsurers' Statistical Manual, various annual editions and pages.*
with earnings of unregulated industries. It also avoids some of the weaknesses of the other two bases discussed below. ADL calculated return on net worth, but mentioned it only in passing.

Return on total assets may be a reasonable yardstick for comparing the rate of return among companies in the same industry, where methods of accounting and sources of funds are reasonably uniform. It becomes a less reliable yardstick when making interindustry comparisons, particularly when comparing the property and liability insurance industry with almost any other industry. The principal reason is the built-in source of financial leverage available to insurers but not to other companies. Most companies that want to leverage the earnings of their stockholders must borrow money and pay interest on it. Insurers, on the other hand, obtain funds without explicit interest cost as a natural consequence of their underwriting operations. The difference in the amount of profits remaining for stockholders can be very substantial.

For example, compare the results shown in Table 7 for two hypothetical companies. The first company is an insurer with policyholders' surplus of $100 million and total reserves of $250 million, approximately the ratio of reserves to policyholders' surplus shown for 1980 in Table 6. The second company is a public utility with net worth of $100 million and bonded indebtedness of $250 million. Both companies earn a 16 percent rate of return on total assets, and

<p>| TABLE 7 |
| Comparison of Earnings |</p>
<table>
<thead>
<tr>
<th>Two Hypothetical Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurer</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Net Worth</td>
</tr>
<tr>
<td>Total Reserves</td>
</tr>
<tr>
<td>Bonded Debt</td>
</tr>
<tr>
<td>Total Assets</td>
</tr>
<tr>
<td>Rate of Return on Assets</td>
</tr>
<tr>
<td>Profit on Assets*</td>
</tr>
<tr>
<td>Interest Paid</td>
</tr>
<tr>
<td>Profit on Net Worth**</td>
</tr>
<tr>
<td>Return on Net Worth**</td>
</tr>
</tbody>
</table>

*Before deduction of interest and income taxes.
**Before deduction of income taxes.
each has total assets of $350 million. The utility pays 15 percent interest on its bonds, approximately the market rate as this is writ-
en. As shown by Table 7, the return on net worth, before taxes, for
the insurance company would be three times as high as the return
for the utility, even though the return on total assets was the same
for both companies.

Income taxes might reduce the disparity of returns, since interest
payments are a deductible expense in the calculation of income
taxes. However, insurers earn large amounts of tax-sheltered in-
come, so the difference in returns on net worth would still be very
substantial.

Return on Investable Funds

The ADL studies used a somewhat modified version of the return
on total assets which ADL called the return on total investable as-
sets. According to the report, this form was used "to overcome the
difficulties caused by seasonal variations in asset levels and differ-
ces in debt/equity ratios" which are inherent in the total asset
approach. Under the ADL approach, return on total investable assets
is:

\[
\text{Return} = \frac{\text{Net Income + Fixed Charges}}{\text{Total Assets - Current Liabilities}}
\]

For insurance companies, the numerator and denominator of the
above fraction are more precisely defined as:

\[
\begin{align*}
\text{Net Income + Fixed Charges} &= \text{Underwriting Profit} \\
&\quad + \text{Interest and Dividends Received} \\
&\quad + \text{Realized Capital Gains} \\
&\quad - \text{Taxes Paid} \\
&\quad + \text{Unrealized Capital Gains}
\end{align*}
\]

\[
\begin{align*}
\text{Total Investable Funds} &= \text{Policyholders Surplus} \ (\text{Net Worth}) \\
&\quad + \text{Unearned Premiums and} \\
&\quad \text{Loss Reserves}
\end{align*}
\]

As one could expect, the ADL studies depicted the insurance
industry as earning a low rate of return. The average return on in-
vestable funds for the forty-three insurers included in the study for the period from 1955 to 1965 was determined to be 4.4 percent.17 Unfortunately, this rate of return cannot be compared directly to the rates of return shown in the study for other industries because the returns for other industries were calculated for the period from 1950 to 1965.18 A footnote indicates that insurance industry earnings were not sensitive to the omission of those five years,19 but the accuracy of that assumption is highly questionable. Property-liability insurer earnings are quite volatile, especially when unrealized capital gains are included. Furthermore, the first half of the decade of the fifties was quite favorable for the insurance industry.

A table published in the Proceedings of the National Association of Insurance Commissioners showed an average rate of return on net worth of 4.6 percent for the years 1955 through 1965, the years included in the ADL study for the insurance companies. The average rate of return for the years 1950 through 1954, the years omitted by ADL for the insurance companies but included for other industries, was 7.0 percent. The average for the full sixteen-year period was 5.3 percent, a 15 percent increase over the eleven-year period from 1955 to 1965.20

The NAC data are not directly comparable to the ADL rates of return because of differences in the sample companies and differences in methods of calculation. However, it seems likely that the two rates of return would vary over time in approximately the same direction and magnitude.

The Measure of Risk

The ADL study also attempted to provide a measure of risk in order to apply the Supreme Court's rule that the rate of return should be proportional to the riskiness of the investment. The measure of risk used by ADL was the variance of the rate of return. ADL assumed that the relationship between risk and the rate of return is linear, so that linear regression techniques can be used to establish the appropriate rate of return if the variance is known. That is, the formula for the calculation of the appropriate rate of return for a given risk is of the form:

\[ \text{rate of return} = a + b \text{ (industry risk)} \]
where the industry risk is measured by the variance of the rate of return.

There are at least two ways that the variance of industry rates of return can be calculated: the spatial approach and the temporal approach. In the temporal approach, the industry's average rate of return for each year is first calculated, and then the variance of those industry average returns is determined. In the spatial approach, the variance of the rates of return among individual companies within the industry sample is calculated separately for each year and the annual variances are averaged to find the variance for the sample period. Each approach has its strengths and its weaknesses. One weakness of temporal risk studies arises from the tendency of corporations to stabilize reported profits by shifting the accounting for income and expenses from one taxable year to another. While this smoothing may result in a low coefficient of determination in the regression equation, it would affect interindustry comparisons only if smoothing is more widespread in some industries than in others.

Another problem with the use of temporal risk measures arises from the nature of the variance. It is merely a measure of the extent to which the rates of return differ from the average rate; it does not distinguish between random variation and trend. Table 8 illustrates this problem. The variances of the rates of return for industries A, B, and C, all hypothetical, are identical. However, it will be noted that

<table>
<thead>
<tr>
<th>Year</th>
<th>Industry A</th>
<th>Rates of Return</th>
<th>Industry C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Industry B</td>
<td></td>
</tr>
<tr>
<td>1971</td>
<td>9.0%</td>
<td>5.0%</td>
<td>14.0%</td>
</tr>
<tr>
<td>1972</td>
<td>5.0</td>
<td>6.0</td>
<td>13.0</td>
</tr>
<tr>
<td>1973</td>
<td>11.0</td>
<td>7.0</td>
<td>12.0</td>
</tr>
<tr>
<td>1974</td>
<td>6.0</td>
<td>8.0</td>
<td>11.0</td>
</tr>
<tr>
<td>1975</td>
<td>14.0</td>
<td>9.0</td>
<td>10.0</td>
</tr>
<tr>
<td>1976</td>
<td>8.0</td>
<td>10.0</td>
<td>9.0</td>
</tr>
<tr>
<td>1977</td>
<td>12.0</td>
<td>11.0</td>
<td>8.0</td>
</tr>
<tr>
<td>1978</td>
<td>7.0</td>
<td>12.0</td>
<td>7.0</td>
</tr>
<tr>
<td>1979</td>
<td>13.0</td>
<td>13.0</td>
<td>6.0</td>
</tr>
<tr>
<td>1980</td>
<td>10.0</td>
<td>14.0</td>
<td>5.0</td>
</tr>
</tbody>
</table>
industry A's rate of return fluctuated widely, while industry B's rate of return trended steadily upward, and industry C's rate of return trended steadily downward.

Industries A and C probably would be considered rather risky by most people, while the risk of industry B would be considered to be rather low. Yet all three have the same variance. Fortunately, this problem does not occur frequently and should be readily apparent from a quick perusal of the data.

The major problem with the spatial variance arises from the lack of homogeneity of many industries. For example, the companies within the automobile industry vary from the makers of mass-market cars, where price competition is sometimes fierce, to the makers of specialized or luxury cars, where a high price is less objectionable and may even be an advantage. The drug industry varies from the makers of low-profit generic drugs to the industry innovators, who have much higher profit margins. The differences in returns among these various firms is not due to chance, and cannot be said to reflect risk. Yet they do result in a larger variance, which would be perceived as higher risk in the ADL study. To the extent that some industries may be more or less homogeneous than others, the spatial measure of risk may misstate the relationship between risk and return.

No detailed empirical studies have been made to evaluate the problems associated with the foregoing aspects of risk measurement. Consequently, the choice between them must be largely intuitive at the present time.

The ADL study found that the risk of the property-liability insurance companies was 10.89. This placed them near the bottom of the range for other industries, which varied from 1.579 for the aluminum industry to 116.859 for radio-TV broadcasters.7 The insurance companies' rate of return of 4.4 percent on investable funds placed them at the very bottom, with the returns of other industries ranging from 6.234 percent for shipping to 18.929 percent for radio-TV broadcasters.8

As might be expected from the foregoing statistics, ADL concluded that:

> By this analysis we find that the rate of risk-related return in the insurance industry is significantly below what other industries earn. This has important significance, for we assert that it is likely that this industry will not in the future be able to attract or retain
Arthur D. Little prepared several additional reports on risk and return for various insurance organizations. All of them followed much the same approach as the original and reached substantially the same conclusions. However, they did place greater emphasis on return on net worth in some of the later reports, acknowledging that:

Returns on net worth are viewed by financial analysts as important measures of performance for stockholder-owned corporations. These returns measure the efficiency with which the company employs stockholders' funds.

Though the primary reliance on return on investable assets placed a severe limitation on the usefulness of the various ADL reports, they did serve to bring the long-smoldering debate out into the open. The resulting controversy has brought much light to bear on the subject of risk and return. Ironically, the AIA, which sponsored the first ADL study, seems to have turned its back on ADL's position that total return, including investment profits, is the most meaningful measure of insurance industry earnings. In a recent advertisement, the AIA reaffirmed its traditional opposition to the consideration of investment income in insurance ratemaking.

The New Jersey Remand Case

While the controversy still raged around the ADL reports, a very significant and closely related development was unfolding in New Jersey. The authors of the ADL reports, along with some of their principal critics, were among the platoons of expert witnesses that met in Trenton to continue the battle over the use of investment income in ratemaking.

The genesis of the New Jersey remand case can be summarized most effectively in the words of Robert L. Clifford, who was then Commissioner of Insurance for the State of New Jersey:

This matter comes before the Commissioner of Insurance on remand from the Supreme Court of New Jersey, in re Insurance Rating
Actuarial Pricing and Insurance Markets

Board, 55 N.J. 19 (1948). The Court has retained jurisdiction, and has given instructions that "a new Determination shall be made... in terms revealing to a reviewing court."

The history of the case dates back to January and February 1967, when the National Bureau of Casualty Underwriters (NBU) and the National Automobile Underwriters Association (NAUA) applied to the then Commissioner of Banking and Insurance for increases in rates for New Jersey Private Insurance and New Jersey Commercial Automobile Physical Damage Insurance.

On January 2, 1968 NBU and NAUA were merged into the Insurance Rating Board, hereinafter IRB.

After hearings the Commissioner filed determinations in February, 1968, denying the respective applications. From these Determinations the IRB appealed. The case made its way to the [New Jersey] Supreme Court, which, after consideration of briefs and argument, found the matter before it "obscure" and called for the further proceedings referred to above.

Specifically the court wants "more information" as to two subjects: (1) the "amount an insurer should receive as a reasonable profit," and (2) the meaning of Commissioner Howell's findings. The hearing was ordered "with respect to what is a proper factor for profit and contingency," as to which some tentative views were expressed."

The hearings on the remand occupied thirty-two days over a period of four months. It produced thirty-two volumes of testimony, one hundred exhibits and was closed by a twenty-five page decision. It was an important milestone in the controversy over investment income in ratemaking, but it raised far more questions than it answered. The Commissioner's findings and some of the arguments preceding them will be summarized briefly below.

The court had indicated that the Commissioner should consider the investment income on unearned premium and loss reserves in establishing rates, so that much was not open to debate at the hearings. However, some considerable discussion was devoted to the question of what investment income should be considered. The IRB proposed that all investment profit should be included, whether derived from: 1) interest, dividends, and rents, 2) realized capital gains, or 3) unrealized capital gains.

The Commissioner concluded that:
As to the return on stockholders' supplied funds from capital gains and investment income, I find in conformity with the tentative views expressed by the Supreme Court that these funds are not relevant to ratemaking. They belong to the stockholder to compensate him for the risk he takes in investing these funds. There will be a later comment on any additional compensation that may be due to the stockholder in return for keeping available for the payment of losses that portion of his funds that is in excess of those "required to do business."

As to the return from the investment of policyholders' supplied funds, capital gains and investment income have to be considered separately. When the insurer invests these funds, it assumes the same prospect of capital gain or risk of loss as is inherent in the investment of stockholders' supplied funds. The insurer must assume the risk of capital losses and is therefore entitled to any capital gain flowing from the investment. Thus, capital gains and losses on reserves also are not relevant to ratemaking and should not affect the rates. 11

Consequently, investment incomes (consisting of interest, dividends, and rents) earned on the unearned premium and loss reserves was to be credited to policyholders in the ratemaking process. Investment income on policyholders' surplus and capital gains and losses from all sources were to be credited to stockholders.

While the Commissioner probably acted in the best interest of policyholders in excluding capital gains and losses from the ratemaking formula, there are some gaps in the logic used to support his conclusion. First, the stockholders assume the risk of capital losses only so long as the insurer remains solvent. If the insurer fails, the risk is borne by policyholders, or perhaps by the insolvency fund. Even if the insurer remains solvent, the policyholders may not be completely insulated from capital losses. Following the stock market decline of the mid-1970s (subsequent to the Commissioner's decision) many insurers argued that they needed large rate increases to replace the surplus lost to declining stock prices.

Second, in recognition of the increased possibility of capital gains, the dividend yield on common stocks is usually less than the interest yield on bonds. Consequently, the policyholders were being asked to subsidize the companies' search for capital gains. If policyholders were to be asked to forego the capital gains, they should
have been credited with the amount of investment income that would have been earned by an equivalent investment in bonds.

With regard to the proper rate of return to be used in ratemaking, the Commissioner found that:

Dr. Plotkin [a witness for IRR] testified that the rate of return based on net worth "is informative for questions concerning private investors and their actions with respect to stockholder-owned insurance companies and the underwriting capacity of those companies." I concur in this statement and rely on this measure of profit to the extent necessary in this determination.20

IRR provided two securities experts... for the purpose of laying a foundation for IRR claims for an overall return from all sources, to wit, investment return and return on insurance operations. These two witnesses expressed opinions that a return of at least 12%, as stated by one, and a return of 12% to 16%, as stated by the other, is required to attract and retain capital in the insurance industry. These returns are after federal income taxes.21

Although it is not explicitly stated in the Commissioner's determination, it appears that he decided that stockholders were entitled to an after-tax return of 13 percent on net worth. He found that net investment income on net worth was 7 percent after taxes and that stockholders were entitled to an additional 6 percent of net worth from policyholders (from both underwriting and investment income on reserves) on the portion of net worth necessary to transact business. Only 7 percent from policyholders was allowed for any part of net worth in excess of the amount required to transact business.

In order to translate the foregoing findings into ratemaking factors, it is necessary to restate them as percentages of earned premiums rather than percentages of net worth. This requires some assumption as to the ratio of premiums to net worth.

The IRR proposed that a ratio of one dollar of premiums to each dollar of net worth be used, based on the industry average for the previous ten years. Opposing witnesses attacked that ratio as too conservative, and proposed a ratio of three or four dollars of premiums for each dollar of net worth. The Commissioner determined that a ratio of two dollars of premiums for each dollar of net worth was appropriate. On that assumption, half of the industry's net worth was needed to transact business and half was excess. Consequently,
the necessary rate of return on net worth, as shown in Table 9, was found to be 3.5 percent.

Since total net worth was approximately equal to premiums, the 3.5 percent return on net worth due from policyholders translated to earnings of 3.5 percent on premiums, after taxes. The Commissioner estimated that investment income for reserves would be approximately 2.5 percent of premiums for automobile liability insurance, so that an underwriting profit allowance of only 1 percent, after taxes, would be needed for that line. Since physical damage reserves (and hence investment income) are smaller, a higher factor for underwriting profit would be required for that line. The New Jersey remand case received much publicity in the insurance trade press, and the NAIC published two monographs explaining it.23 The decision in the case stimulated interest in the issue in several other states.

**Massachusetts Automobile Rate Hearings**

In May, 1975, Commissioner James M. Stone of Massachusetts served notice on the industry that:

"It is absolutely incomprehensible to me how the industry could have successfully argued for so long that an underwriting profit margin should be programmed into the rates without regard for the

<table>
<thead>
<tr>
<th>TABLE 9</th>
<th>Calculation of Return on Net Worth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>New Jersey Remand Case</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Net Worth</th>
<th>(2) Percent of Total Net Worth</th>
<th>(3) Rate of Return from Policyholders</th>
<th>(4) (2) x (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Necessary*</td>
<td>.50</td>
<td>.06</td>
<td>.03</td>
</tr>
<tr>
<td>Excess**</td>
<td>.50</td>
<td>.01</td>
<td>.005</td>
</tr>
<tr>
<td>Return on Total Net Worth</td>
<td></td>
<td></td>
<td>.035</td>
</tr>
</tbody>
</table>

*Necessary net worth is defined as the amount of net worth necessary to maintain a ratio of one dollar of net worth for each two dollars of earned premiums.

**Excess net worth is defined as the amount of actual net worth in excess of necessary net worth as defined above."
investment implications of the business. It does not take an econ-
omist to know that if someone takes a dollar from you and returns
$.95 one year later, his profit on the transaction was the sum of the
five cents directly taken and the gain from the use of your money
for the year’s period.13

With this comment, Commissioner Stone began one of the most
interesting assaults to date on the 1921 standard underwriting profit
formula. Like the New Jersey remand case, the hearings that fol-
lowed were contests between platoons of expert witnesses, a total of
forty in one proceeding. The final result was the introduction of the
Capital Asset Pricing Model (CAPM) into the realm of insurance rate
regulation.

The CAPM was developed initially as a simplification of the
mathematical theory of portfolio selection. Its initial purpose was
the selection of a diversified investment portfolio that would provide
the maximum rate of return for any given level of risk or the lowest
risk for a given rate of return, risk being measured by the variance
of the return.14 Its use was extended later to the estimation of the
market value or required rate of return on a capital asset.15 The
CAPM assumes that the required return on a capital asset is equal
to the sum of: 1) a constant, plus 2) another constant multiplied by
a measure of a market rate of return, plus 3) a random variable with
an expected value of zero. In mathematical notation:

\[ r_s = a + \beta r_m + \gamma, \]

\( r_s \) = required return on the given capital asset,
\( r_m \) = market rate of return,
\( a \) = a constant, frequently assumed to be the rate of return
on a risk-less investment,
\( \beta \) = a parameter indicating the relationship between the
rate of return on the given capital asset and the market
rate of return,
\( \gamma \) = a random variable with expected value of zero and un-
known variance.

The constants \( a \) and \( \beta \) are usually estimated by linear regression
techniques, which implies an assumption that the relationship be-
tween risk and return is linear. The constant \( \beta \) is usually referred to
as the systematic risk, since it is a measure of the way in which the return from the selected capital asset varies with the market rate of return. The market rate of return usually is assumed to be indicated by the return on some broadly based portfolio of securities, such as the Standard & Poor's 500 stock index. The constant $\gamma$ usually is referred to as unsystematic risk, and cannot be measured satisfactorily by the CAPM.

The CAPM has been used extensively in rate hearings for public utilities. One survey indicated that it had been used in twenty-eight such hearings in twenty states and before the Federal Communications Commission.4 About three-fourths of testimonies in the survey used the formula cited above, an additional 13 percent used a variation of it. The variation used by this minority is

$$r_i - r_f = a + \beta (r_m - r_f) + \gamma,$$

where

$r_i$ is the rate of return on some risk-free investment, and the other symbols have the meanings previously assigned to them. Since $r_f$, the risk-free rate of return, is specified in the immediately foregoing formula, this model specifically recognizes the variation of the risk-free rate.

The constants $a$ and $\beta$, were determined in the utility cases by regressing the rate of return on the individual utility stocks against the rate of return on some broadly based index. Most frequently the New York Stock Exchange Index or the Standard & Poor's 500 stock index. Return usually was defined to include both dividends and market appreciation of the stocks, but the omission of dividends seems to have little effect since they tend to remain relatively constant over time.5

The use of CAPM in utility rate hearings have, been criticized on the grounds that: 1) it is based on unrealistic assumptions, 2) there is no consensus as to the appropriate risk-free rate of return, 3) the risk premium cannot be measured precisely, 4) historical betas are unstable, and 5) no one knows how to determine a future beta.6 However, the CAPM has not lacked defenders.7

In contrast to its rising popularity in utility regulation, it appears that the CAPM has not been used in insurance regulation except in Massachusetts. This lack of use may stem, at least in part, from the difficulties involved in the estimation of $\beta$.8
Utility companies tend to specialize in one kind of utility service, such as gas, electricity, etc. Consequently, a single beta is needed, and it can be estimated on the basis of the rate of return on the utility’s stock. However, most insurance companies are multiple-line underwriters, and the risk varies by line. Consequently, a separate beta is needed for each line. Clearly, all of the betas for all lines cannot be estimated from the rate of return on the insurers’ stocks. Fairley used a rather complex procedure for estimating beta from other data.

The procedure begins with the assumption that an insurer’s rate of return on equity can be represented, in Fairley’s notation, by the formula:

\[ r_e = \frac{r_a [kM + V_e + pM]}{V_e} \]

where
- \( r_e \) = rate of return on net worth,
- \( r_a \) = rate of return on invested assets,
- \( k \) may be considered to be either the average number of years each dollar of premium can be invested,
- \( M \) = premiums written,
- \( V_e \) = the value of net worth, and
- \( p \) = the margin for underwriting profit.

A bar over a variable symbol indicates the value of the variable which is expected to prevail during the period in which the rates are to be used.

In plain English, the formula says that the insurer’s earnings, before taxes, are equal to the sum of: 1) the investment income on reserves, 2) the investment income on net worth and 3) underwriting profit. While this overlooks some minor items of income, it is sufficiently accurate for practical purposes.

If the indicated division by \( V_e \) is made in the above formula, it becomes:

\[ r_e = r_a \frac{ka + 1}{p}, \]

where
\( s = \text{ratio of written premiums to net worth. If the insurer writes more than one line of insurance, then } k \text{ and } \beta \text{ must be viewed as the weighted average of the values for the individual lines, with the premiums used as weights. Table 10 shows the values of } k \text{ for several lines of insurance as given by Fairley.}

Fairley then identified four betas applicable to insurance companies:

\[
\beta_s = \text{the systematic risk relative to the return received on invested assets,}
\]

\[
\beta_e = \text{the systematic risk relative to the rate of return on equity (or net worth, or policyholders' surplus),}
\]

\[
\beta_l = \text{the systematic risk relative to the implicit interest payments on liabilities, and}
\]

\[
\beta_p = \text{the systematic risk relative to underwriting profit.}
\]

Each of the four betas can be defined by the covariance of its related rate of return, along with the variance of the market rate of return. Specifically:

\[
\beta_s = \frac{\text{Cov } F_s, F_m}{\text{Var } F_m}
\]

**TABLE 10**

Return on Cash Flow and Average Reserves per Dollar of Premiums

<table>
<thead>
<tr>
<th>Line of Insurance</th>
<th>Return on Cash Flow**</th>
<th>Average Reserves per Dollar of Premiums, K</th>
<th>Total U.S. Earned Premiums (Billions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Bodily Injury</td>
<td>16.8</td>
<td>1.60</td>
<td>4.8</td>
</tr>
<tr>
<td>Auto Property Coverage</td>
<td>3.2</td>
<td>.31</td>
<td>7.7</td>
</tr>
<tr>
<td>homeowners'</td>
<td>3.7</td>
<td>.35</td>
<td>3.4</td>
</tr>
<tr>
<td>Workers' Compensation</td>
<td>16.8</td>
<td>1.60</td>
<td>4.6</td>
</tr>
<tr>
<td>Weighted Average</td>
<td>9.5</td>
<td>.91</td>
<td>20.5</td>
</tr>
<tr>
<td>Medical Malpractice</td>
<td>40.3</td>
<td>3.74</td>
<td></td>
</tr>
</tbody>
</table>


**Assumes interest rate of 10% percent**
\[ \beta_0 = \frac{\text{Cov} \, \bar{r}_0, \bar{r}_m}{\text{Var} \, \bar{r}_m} \]
\[ \beta_1 = \frac{\text{Cov} \, \bar{r}_1, \bar{r}_m}{\text{Var} \, \bar{r}_m} \]
\[ \beta_i = \frac{\text{Cov} \, \bar{r}_i, \bar{r}_m}{\text{Var} \, \bar{r}_m} \]

Since Fairley had assumed that:
\[ \bar{r}_i = -k \bar{r}_m, \] it followed that
\[ \beta_i = -k \beta_i. \]

By substitutions in the formula:
\[ \bar{r}_i = \bar{r}_i \left[ k s + 1 \right] \beta_i, \] given above,

Fairley obtained the formula:
\[ \beta_i = \beta_0 \left[ k s + 1 \right] + \beta_i s, \]

from which the value \( \beta_i \) can be estimated. The values of \( k \) and \( s \) can be calculated readily from insurance industry data. The value of \( \beta_i \) was estimated from the expression \( \beta_i = -k \beta_i \), given above.

To find \( \beta_i \) for a given line of insurance, the \( k \) for that line is substituted into the above expression. \( \beta_i \) is assumed not to vary by line. Fairley estimated the value of \( \beta_i \) from a sample of insurers reported in the Value Line Investment Survey. The Value Line reports \( \beta_i \) and \( \beta_i \) can be calculated from the betas for securities in the companies' investment portfolios. The value \( \beta_i \) can then be found by solution of the equation:
\[ \beta_i = \left( 1 - t \right) \left[ \beta_0 \left( k s + 1 \right) + k \beta_i \right], \]

which is derived by substitution into the expression \( \beta_i = \left[ \beta_0 \left( k s + 1 \right) + k \beta_i \right], \) given earlier. The symbol \( t \) in the above equation is the income tax rate, the other symbols have the meanings previously assigned. Fairley estimated the value of \( \beta_i \) to be 0.21. Substituting that value and the appropriate \( k \) values from Table 10 into the expression:
\[ \beta_i = -k \beta_i. \]
gives the following values of \( \beta \): automobile bodily injury, 0.34; automobile property damage, 0.07; homeowners 0.07, workers' compensation, 0.34; and medical malpractice, 0.79.

The final step is to find the allowance for underwriting profit, \( p \), to be included in the rates. The appropriate value of \( p \) is the value for which \( r_f \) for the line of insurance is equal to \( r_e \) for the line. The formula for \( r_f \) the risk-adjusted after-tax target return is:

\[
r_f = r_e - \beta \left( r_m - r_f \right)
\]

but, as shown earlier, \( \beta = \left[ \beta_e \left( k + 1 \right) + \beta_s \right] s \). Substituting that value for \( \beta \) into the foregoing equation yields:

\[
r_f = r_e - \beta_e \left( k + 1 \right) - \beta_s \left( r_m - r_f \right),
\]

where \( \beta_e \), \( k \) and \( \beta_s \) are all related to the specific line of insurance. As shown earlier,

\[
r_e = r_k \left( k + 1 \right) + \beta_s
\]

Substituting \( r_e = r_e \left( k + 1 \right) + \beta_s \) for \( r_e \) in the foregoing formula yields:

\[
r_f = r_e - \beta_e \left( r_m - r_e \right) \left( k + 1 \right) + \beta_s,
\]

where \( r_k \), \( k \) and \( \beta_s \) are all for the selected line of insurance. Setting the above formula for \( r_f \) equal to the formula for \( r_e \) and solving the \( p \) yields:

\[
\bar{p} = -k \bar{r}_e + \beta_s \left( r_m - \bar{r}_e \right),
\]

where \( \bar{p} \), \( k \) and \( \beta_s \) are for the selected line of insurance. \( \bar{r}_e \) is the rate of return on a risk-free investment, and Faireley used the yield on one-year United States government bonds, 6 percent at the end of 1975, as the value for \( r_e \).

The quantity \( r_m - \bar{r}_e \) is the difference between the yield on a broad market portfolio of investments and the yield on a risk-free investment. It is known as the market risk premium, and Faireley used the value of 8.8, the average value for years 1926–1974.

All of the formulas and all values have now been provided for the calculation of \( p \). For automobile bodily injury liability insurance, the values are
\( k = 1.60, \text{ from Table 10} \)
\( \bar{r} = 6.0 \text{ (for all lines)} \)
\( \bar{s} = .34 \)
\( |\bar{r} - \bar{s}| = 8.8 \text{ (for all lines)} \)

However, Fairley indicates the values given above are "modified slightly by a discounting factor" which is not included in his paper. The values of \( p \), as calculated by Fairley, are shown in Table 11, as columns 11.

A somewhat more advanced version of the CAPM approach is presented in some detail in a memorandum issued by the Massachusetts Division of Insurance in 1981. The memorandum presents, in considerable detail, the application of CAPM to ratemaking for commercial automobile insurance.

It appears that Massachusetts is the only state to use the CAPM in rate regulation. However, it has been suggested for use in New York in the enforcement of that state's excess profit law.

Fairley's model has been criticized on the grounds that: 1) it fails to clearly distinguish between before-tax and after-tax returns in the

<table>
<thead>
<tr>
<th>Line of Insurance</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CAPM Margin</td>
<td>Traditional Margin</td>
<td>Historical Margins 1966-1975</td>
<td>Historical Margins 1971-1975</td>
</tr>
<tr>
<td>Auto Bodily Injury</td>
<td>-6.0</td>
<td>1.0**</td>
<td>5.6</td>
<td>5.3</td>
</tr>
<tr>
<td>Auto Property Damage</td>
<td>-0.1</td>
<td>5.0</td>
<td>1.6</td>
<td>1.2</td>
</tr>
<tr>
<td>Homeowner</td>
<td>-6.3</td>
<td>6.0</td>
<td>-9.7</td>
<td>-0.4</td>
</tr>
<tr>
<td>Workers' Compensation</td>
<td>-6.3</td>
<td>2.5</td>
<td>-2.3</td>
<td>-0.4</td>
</tr>
</tbody>
</table>


**This is the traditional allowance for underwriting profit in Massachusetts, an allowance of 5 percent has been used in most other states.
derivation of the system, 2) it lacks a uniform time horizon for the parameters, 3) it is extremely sensitive to the parameter estimates used, and 4) values of its parameters cannot be determined with any degree of precision.44

However, Fairley probably would reply by acknowledging some weaknesses in the system, but pointing out that:

In the context of actual decision making, a trite but sometimes overlooked point is that choices must be made. The option of reserving judgment until more evidence comes in is usually not available.45

It also should be noted that the Supreme Judicial Court of Massachusetts, in upholding the Commissioner's decision on the 1976 automobile insurance rates, has commented on the CAPM model as follows:

. . . we are mindful that the Commissioner's approach to the profit allowance is not only novel but complicated, and that somewhat greater imprecision must be tolerated in its initial application than might be acceptable in later years.46

And although . . . the model may depart from the behavior of real-world companies, it is of the essence of the use of a model that it makes simplifying assumptions. The model is unrealistic only in the sense that no actual insurer happens to conform its behavior to the assumptions, not in the sense that its assumptions are fanciful or impossible to match in the real world.47

If only perfect ratemaking techniques were permitted, the ratemaking process would return to its status of a century ago, when rates were determined solely by the judgment of underwriters. That must surely be the least precise of all the available ratemaking techniques.

The State Experience

Some states have not taken any official action regarding the consideration of investment income in ratemaking. Those that have can be classified into two groups: those that follow the "policyholder-funds theory" and those that follow the "total-return theory."
The policyholder-funds theory holds that policyholders should be credited with the investment income on funds furnished by policyholders. There are two branches of the theory, differing primarily in what is considered to be policyholder funds. Some states consider only the unearned premium reserve to be policyholder funds, while others include both the unearned premium and loss reserves as policyholder funds.

The total-return theory holds that an insurer is entitled to a return on net worth (or some other base) equal to the return earned by nonregulated industries of similar risk. Consequently, investment income from all sources would be considered in ratemaking, not merely investment income from policyholder funds. The principal difference between the two theories is the allocation of investment income on the firm's policyholders' surplus or net worth.

Under the policyholder-funds theory, the investment income derived from the assets counterpart to net worth is considered to belong to the owners of the company, and is not accounted for in ratemaking. Under the total-return theory, the investment income from net worth would be included in the ratemaking formula.

In 1981, the Louisiana Insurance Rating Commission surveyed the states to determine their positions regarding the inclusion of investment income in ratemaking. Forty-six states and the District of Columbia responded. Of the jurisdictions that responded, seventeen required consideration of investment income in ratemaking. An additional twenty-four permitted it to be considered. The remaining six neither permitted nor required such consideration.

The Louisiana Insurance Rating Commission apparently considers that it is authorized to require consideration of investment income under the section of the Louisiana Insurance Code which says, in part, that "Due consideration shall be given to past and prospective loss experience . . . and to all other relevant factors within and outside this state." This phrase, which appears in the rating laws of a great many states, would seem sufficiently broad to include investment income if it is not in conflict with some other code provision, such as the requirement of an allowance for underwriting profit.

New York, New Jersey, and North Carolina, the three states that did not respond to the Louisiana survey, all have statutes or court rulings requiring consideration of investment income. As indicated elsewhere herein, New Jersey has been a leader in the use of invest-
ment income in ratemaking. The New York law seems to require consideration of investment income from all sources, while the North Carolina law requires consideration of investment income from unearned premiums and loss reserves. By a margin of about three to one, the states responding to the Louisiana survey followed the policyholder-funds theory. Only six required consideration of investment income from policyholders' surplus. Thirteen of the responding states said they were unable to detect any measurable effect on rates resulting from the inclusion of investment income. Twenty-one indicated that they were able to detect some effect.

The Future

It seems likely that additional states will require consideration of investment income in ratemaking in the years ahead. This development is especially likely for personal lines because competition is less likely to force such consideration for those lines. Workers' compensation and medical malpractice also are likely candidates because of their large loss reserves and their political importance.

Several decisions will need to be made as the movement progresses. First, the desirability of some consistency among states will require a choice between the policyholder-funds theory and the total-return theory, very likely involving a movement toward the latter.

Second, a decision will need to be made about the inclusion or exclusion of capital gains. Reasonable rate stability would seem to call for the exclusion of unrealized capital gains. Fairness to insurers would seem to require that realized capital gains not be included unless unrealized gains are included. To require insurers to bear the risk of unrealized capital losses without the full rewards would seem to be inequitable.

On the other hand, if insurers are to receive the full benefit of capital gains, the policyholders may be shortchanged a bit, since the dividend yield on stocks usually is less than the interest yield on bonds. Some adjustment may be needed on this account.

One way to avoid the foregoing problems would be to adopt some variation of the Massachusetts rule of giving the policyholders the equivalent of the yield on a risk-free investment portfolio. If insurers choose to invest in securities with higher risk, the excess profit or
loss would be solely for their own account and would neither in-
crease nor decrease the rates for policyholders.
A decision also must be made on the ratio of premiums to poli-
cyholders surplus to be used in rate calculations. The use of histor-
ical ratios would tend to encourage inefficiently low ratios by pro-
viding high returns at low risk. Setting the ratio too high may be
unreasonable, since the market may not expand quickly enough to
permit insurers to achieve a ratio much higher than the existing
ratio. Of course, the ratio could be raised by removing capital from
the industry, but it does not seem to be in the best interest of poli-
cyholders to encourage that alternative. As shown by Table 4, the
ratio of premiums to net worth is now less than two to one and
declining it seems desirable to avoid encouraging the decline, so per-
haps an assumed ratio of 2-to-1 or 2.5-to-1 would be appropriate.
More research is needed to determine the maximum ratio that can
be maintained with reasonable safety, and that ratio should then be
approached gradually and carefully.
Perhaps the most significant problem is the determination of the
appropriate return to be permitted. There is little question that net
worth is the proper base for the return, but the magnitude of the
proper return is still in question. Both the CAPM and the method
proposed by Arthur D. Little, Inc. have serious deficiencies, but no
better systems have been suggested. Some requisites of a good sys-
tem for the selection of an appropriate return are:
1. It should provide a rate of return which varies directly, but
not necessarily linearly, with risk;
2. Ideally, it should reflect future risk and future capital costs,
since rates are made to be used in the future; and
3. It should be reasonably simple and understandable.
The Massachusetts system complies in reasonable degree with the
first criterion, but falls far short on the third. The use of tredding
in later versions has helped it to approach the second criterion. The
ADL approach could be used, with some modification, to comply
reasonably with all three. However, it is by no means certain that
either of these systems is the best that can be devised. A great deal
of research is still needed in this aspect of the problem.
How will insurers be affected by the inclusion of investment
income ratemaking? Other than a little more work for their actuari-
ies, the effect is likely to be small. Personal lines rates may be reduced somewhat, but the change is likely to be small. The main-street commercial rates also may be reduced slightly, but the rates for the larger commercial risks probably already reflect investment income fully or perhaps even excessively. The advantage of removing an irritant in insurer relations with the public and regulatory authorities may well outweigh any disadvantages of the change.

Those who push for the inclusion of investment income as a means of reducing premiums may be disappointed. Studies made to date have indicated premium reductions ranging from very small to nonexistent. While not conclusive, these results tend to support the industry's position that investment income is already reflected in rates. However, it appears that the extent to which investment income is now reflected in rates tends to vary with the underwriting cycle, being reflected more fully in periods of vigorous competition.

Notes

4. Ibid.
8. Ibid.
10. Ibid., p. 99.
13. Ibid., p. 68.
Actuarial Pricing and Insurance Markets

17. Ibid, p. 35.
18. Ibid.
20. The averages were calculated by the author from National Association of Insurance Commissioners, Proceedings 1970 (Milwaukee: National Association of Insurance Commissioners, 1970), p. 906, Table III-A.
22. Ibid.
29. Ibid, p. 15.
30. Ibid, p. 16.
36. Ibid, p. 79.
37. Ibid, pp. 77, 78.

41. Massachusetts Division of Insurance, A Profit Model Based on a Company's Actual Portfolio, (Boston, MA: Massachusetts Division of Insurance, 1981).


44. William B. Fairley, op. cit., p. 192.


46. Ibid., p. 765.


48. Ibid.
Introduction


William O. Bailey's article has the distinction of being the first article to appear in the Journal of Insurance Regulation. True to the mission of the Journal, this article explored the rationale and intellectual underpinnings to the puzzling state of workers' compensation rate regulation. Despite solid evidence that a competitive industry stands ready to serve this major line of insurance, most states closely regulate its rates, forms and rules.

In 1980, the NAIC revised its competitive rating model act to include provisions for competitive provision of workers' compensation insurance. Controversy erupted. Bailey observes that there was "tension" in the "traditionalists" of the insurance industry embracing "attitudes of the left." Bailey's article catalogs the arguments of the traditionalists: erosion of the experience database, inability of small insurers to compete, loss of commitment to loss control, difficulty of reviewing multiple manuals, and availability problems for small employers. The capstone argument is that the industry is already competitive and working well. Why disturb it? These same arguments (with decreasing success) have been used over the years in other property and liability markets to defend collective rate, rule and form provision by a rating bureau.

He summed up by arguing that since our economy has consistently favored market-based pricing and production, the burden of proof should be on those who claim that worker's compensation insurance requires regulatory controls. Since only six states had switched to varying degrees of open competition within a year or two of his writing, Bailey could not offer much evidence of the damage caused to small employers and insurers.
Enter Rob Klein's thorough review and evaluation of Michigan's post-reform experience with open market rating of workers' compensation. In 1983, Michigan was among the second cohort of states to bolt from prior approval and uniform application of workers' compensation rates. Why? Klein offers a succinct review of the politics of regulatory change. He argues that a recessionary economy looked for relief from high unemployment and high operating costs. The legislature trimmed benefits. Employers wanted still more savings. They looked to competition in the supply of workers' compensation to trim further their cost of insurance. After all, intense competition from foreign and domestic rivals pressured Michigan businesses to greater efficiency and lower costs. Likewise, competition in the supply of workers' compensation should lower rates and make Michigan employers more cost competitive.

The legislation creating open rating was a boon to the benefits of market versus administered systems. The forces of deregulation clearly saw competition as the best way to ensure availability, flexibility, fairness, and efficiency in workers' compensation insurance. With this, decades of data-intensive classic actuarial models were set backstage. Allocations of business, its cost, and profits were going to be derived by markets. Before evaluating the success of the Michigan switch to competitive rating, Klein offers a framework for determining when regulation should displace or constrain market-based outcomes. Economists have well-established yardsticks to measure the functioning of any industry: structure, conduct, and performance. These principles guide state and federal antitrust policy and form the basis for legislation to intervene in any segment of the economy. "Highly competitive" is Klein's assessment of the workers' compensation insurance market. The structure of the industry—size, number of firms, market share—all work to make it so. On conduct, Klein also gives the insurance industry good marks: it prices competitively and does not discriminate unfairly against any market segment. Finally, he argues that performance is good if efficient, innovative, and no excessive profit taking, except where constrained by government regulations. Thus, by the economist's test for efficiency of markets Michigan was ripe for deregulation in favor of competition. Klein took careful measure of Michigan's experience with competitive rate making. His data shows that competitive rating appeared to lower the overall cost of comp to employers relative to...
where it would have been in a regulated environment. Profits were kept in line with market needs for sustaining capital. Service and choice were maintained. The one dark side seems to be the sizable growth in the residual market mechanism. Aside from some evidence of availability problems, all indications suggest that competitive rating has worked very well in Michigan.

As shown throughout this volume, objective actuarial principles for establishing the cost of an insurance product often are ignored to serve politics and satisfy public opinion. Michigan's experience shows that collective rate making using formal experience-based actuarial principles, though done with the best of intentions, may foster inefficiency by protecting inefficient insurers against their more efficient rivals. Bob Klein has spent much of his career designing regulation and regulatory systems through the NAIC. However, in this and other writings he forcefully advocates reliance on free markets. The two beliefs are mutually compatible if regulation is held in check for when and where the competitive markets have failed to bring about good industry structure, conduct and performance.
Competitive Rating and Workers' Compensation

William O. Bailey

People who favor regulatory reform occupy all parts of the political spectrum. Those on the left consider traditional regulation to be more protective of the interests of the industry being regulated than of the public interest. To them, regulatory reform means stronger command and control power. Those on the right consider regulation to be hostile to the industry being regulated, imposing unnecessary costs that must be passed on to consumers while preventing timely response to changing public needs. To them, regulatory reform means deregulation.

One of the ironies in the debate about extending competitive rating to workers’ compensation is that traditionalists appear to have adopted some of the attitudes of the left—that this part of the insurance business must be closely regulated if the public interest is to be served. The progressives, for their part, have adopted some of the attitudes of the right—that excessive regulation can obstruct the public interest.

There are other ironies. For example, when the National Association of Insurance Commissioners [NAIC] adopted its model competitive rating bill in 1980 addressing all voluntary property/casualty insurance lines, the most controversial provision of the model act was its inclusion of workers’ compensation. However, since then, with the exception of Kentucky, which enacted a comprehensive competitive rating act, all recently enacted competitive rating laws have been directed solely at workers’ compensation insurance. The final irony is the dispute itself. A large majority of companies within the property/casualty insurance industry supports the concept of allowing competitive market forces to regulate premium rates, but there is a significant split when that concept is extended to workers’ compensation.
Those who oppose competitive rating for workers’ compensation fear a variety of adverse results: erosion of the industry-wide data base relied on by regulators and carriers alike, the instability of regulators to regulate and of small carriers to compete, a decline in loss covered efforts, lessened interest in the small business market, unstable premium rates, and increased potential for insolvencies. Those who support greater price competition for workers’ compensation are confident that such problems as might arise are readily solvable in a properly structured program. Further, they are convinced that competition will assure fair but adequate rates, greater availability of coverage by promoting more stable earnings, improved response to changing markets, and freer choices for customers. In essence, they see less justification for treating workers’ compensation differently from other lines.

Both sides agree on the paramount goal of maintaining quality of service and sound operation of the system. Nothing less can preserve the industry’s role in what is essentially a social insurance program. With workers’ compensation accounting for about $14.5 billion of a total of around $95 billion of property/casualty premium in 1981, the debate is far more than an intellectual exercise.

The Workers’ Compensation System

Today

Before discussing the issues, it might be well to describe the workers’ compensation system as it has evolved to this point. It is a social insurance program that for the most part is privately underwritten. In 32 states, all workers’ compensation is written by private carriers, except for a small but growing amount of self-insurance and group self-insurance. Twelve states operate state funds in competition with private insurers and self-insurers. Six states exclude all private participation and operate their own state funds. As is true of insurance generally, the private market is far from concentrated. The largest carrier holds less than a 9 percent share.

Benefits prescribed by law are paid for personal injuries caused by accidents arising out of or sustained in the course of employment, including physical, mental, and nervous disease. Over the years, both courts and legislatures have tended to broaden the definition of occupational injury and disease to the point where some observers
believe the relationship between injury and employment is becoming tenuous.

A problem inherent in the way the workers' compensation system is currently structured arises from the fact that legislatures determine the level of benefits while premium rates are set by regulators. Legislatures are encouraged by organized labor to increase benefit levels and broaden the definition of occupational injury. Regulators, on the other hand, are encouraged by business to hold down premium rate increases occasioned by rising benefit levels and the effect of inflation on open-ended medical cost benefits. Compounding this has been inconsistent administration of workers' compensation laws and benefit determination by state industrial commissions. The interplay of interests and authority in combination with the lag inherent in the prior approval process has tended to produce rate inadequacy. A line of the property/casualty business that once was marked by modest but stable earnings has become volatile, presenting the potential for large and seemingly erratic premium rate increases whenever the pressures seriously threaten the insurance mechanism or the residual market balloons. That in turn could set the stage for demands that it be moved from the private to the public sector.

Role of Rating Bureaus

The rate-making process differs from other property/casualty lines in that virtually all workers' compensation underwriters belong to rating bureaus. The bureaus develop rates and submit them for regulatory approval. Because the role proposed for rating bureaus under competitive rating is the focus of those in the industry who oppose change, it might be well to consider the current activities of the bureaus in some detail.

Rating bureaus have three main functions: to collect data, to develop and file rates and rating plans, and to evaluate the cost of proposed changes in the law. The rating bureaus collect loss, expense, exposure, and premium data from insurers, who are required to report on a uniform basis. From that data base the bureaus develop industry and occupational premium rates. Next, they submit the class relativities and premium rate schedules to the state insurance departments for approval. When approved, they are published in
manual form. The collection of loss data is an especially vital function. With approximately 600 risk classifications, no company, even the largest, can have a credible body of data for every classification in each state. Indeed, even industry-wide data are not available in credible amounts for all of those classifications, leading some observers to suggest that consolidating 600 into a smaller number might make the data more useful to all who depend on it.

Pricing Flexibility

There is some flexibility allowed in using individual state manuals. In many states, an insurer can apply for a uniform deviation upward or downward from manual rates. In addition, in some states an insurer can apply for deviations from other rating elements—that is, from manual schedules, rating plans, or rules. In practice, upward deviations have been rarely granted and downward deviations were seldom sought. The prior approval requirement entails filing reviews and rate hearings that are burdensome and viewed as unproductive because of the perception that only downward deviations are likely to be approved. These have not been sought because rate inadequacy has been a recurring problem in recent inflationary times, making redundancy a temporary condition. Half of the ten years between 1971 and 1981 produced combined ratios above 100 percent, reflecting rising medical costs, changing social attitudes, and the tendency to broaden the definition of occupational injury. Recently, there has been an increase in requests for downward deviations, but these have been concentrated in Florida following passage of the wage loss law and in Colorado where greater freedom to compete is a possibility and the underwriting outlook is comparatively favorable.

The system allows a measure of flexibility short of deviations. Small employers pay manual rates, while large employers receive discounts because acquisition and administrative costs are spread over a large premium base. Larger risks also can be experience-rated, but these account for only 15 percent of all risks.

Despite the pricing flexibility that exists in the workers' compensation market, there has been growing interest, both within the industry and among informed observers of the insurance business, in competitive rating legislation—in allowing market forces to do naturally what most states attempt to do artificially by regulating
property/casualty premium rates. Pricing freedom in combination with competition produces premium rate levels that yield reason-
able and stable profits, which in turn assure the ready availability of fairly priced coverage to consumers. Although a number of states have successfully permitted competition to regulate premiums in most property/casualty lines and the NAIC has developed a model competitive rating act to encourage the adoption of the concept, competitive rating was not applied to workers' compensation by any state until 1981. Despite the enactment of competitive rating legis-
lation for workers' compensation by three states in 1981 and another three so far in 1982, pricing freedom for workers' compensation re-
mains a very controversial subject.

The Initiative for Extending Competitive Rate to Workers' Compensation

With the preceding for background, let us turn now to the effort to develop a model open competition act which would include workers' compensation. In December 1978, the NAIC directed its Competi-
tion [B-S] Subcommittee to review the NAIC model property and liability rating act with the view of placing greater reliance on com-
petition. In June 1979, the Subcommittee, chaired by H. P. Hudson, then insurance commissioner of Indiana, released a discussion draft of an alternative rating law for study by four NAIC task forces and evaluation by an advisory committee.

The Advisory Committee, created in August 1979 by Commis-
sioner Hudson, consisted of insurance company executives, trade and bureau organization leaders, agents, consumer representatives, a major risk management representative, and an academician. This variety of viewpoints subjected not only the discussion draft but also the position of each member to searching scrutiny and challenge— not the easiest but certainly the best way to arrive at a consensus on issues that touch virtually all private sector employers and their em-
ployees, and many in the public sector as well.

The Advisory Committee submitted its report to the Subcommittee in May 1980. After a free exchange in the series of meetings and discussions, the Subcommittee refined its proposed competitive rating act, which was adopted by the NAIC in December 1980. The
mode's competitive rating act includes the following key positions with respect to workers' compensation:

1. Workers' compensation rates need not be filed; they would be regulated under a "use" or "no-file" provision after a two-year transition period of "file and use."

2. Any agreements to adhere to manual rates would be prohibited; each insurer must develop and file its own manual rates. However, workers' compensation would be exempted from the provision barring agreement to adhere to any "rating plan, rating schedule, rating rule, policy or bond forms, rate classification, rate territories, underwriting rules, surveys or inspections." Furthermore, an advisory organization would be permitted to prepare and distribute pure premium data, adjusted for loss development and loss trending in accordance with its statistical plans.

3. Uniform reporting of experience on a classification basis consistent with that of an advisory organization designated by the commissioner would be required.

4. During the two years following enactment, advisory organizations would be permitted to provide advisory rates, but not file these for their member companies.

Opposition to the Model Act

Those in the industry who oppose extending competitive rating laws to workers' compensation share a number of concerns. Foremost is the fear of erosion of the data base. As larger insurers depend on their own data, they supposedly will have less incentive for helping keep industry data timely and accurate. At the same time, the loss of uniform class relativity will make it more difficult for companies to provide data useful to rating service organizations.

The combination of an eroding data base and the publication only of advisory pure premiums by rating bureaus would, in the opinion of opponents, place heavy actuarial demands on small companies, many of which would be forced from the field. The concentration that would result, according to that scenario, in turn would lead to a loss of interest in writing small cases. This would stimulate
further excessive growth of the residual market and also encourage the spread of group self-insurance plans. Opponents of competitive rating also believe it would place too much emphasis on front-end price, leading to a reduction of loss control efforts.

In addition, opponents contend that without a central rate-making authority, legislatures would lose a means of learning the probable cost to employers of proposed benefit change. With each company making its own rates, regulators would find their resources severely strained, and the loss of uniformity would make price comparison by consumers difficult. Finally, some who oppose extending competitive rating to workers' compensation say change is unnecessary because the current system is working well and ample competition is already present through the deviation option, experience rating, participating policies, and retrospective rating. However, if the system is working well, one wonders why so many participants in it are expressing dissatisfaction and pressing for the establishment, at a minimum, of additional competitive state funds. Further, it is hard to see how someone can hold the position that ample competition already is present, and also believe that competitive rating would impede such important services as loss control or lead to commission cutting and other perceived problems that would follow. The formation of captives and the increase in self-insurance further suggests that the present insurance pricing system is not fully satisfactory to employers. Let us look at some of the concerns in greater detail.

Alleged Erosion of Data Base

As noted, the NAIC model bill not only prohibits agreements by insurers to adhere to advisory rates but also requires them to submit data on a uniform basis to an advisory body designated by the commissioner. Put bluntly, an insurer's license to continue writing workers' compensation would be contingent on the reporting of data by class and risk in accordance with the requirements of the advisory body. Yet, with each company free to depart from rigid classifications, that will mean either converting company data to achieve uniformity or keeping two sets of records—operating records and reporting records. With the operating records being of vital interest to an insurer, how accurate and timely will the reporting records be?
The opponents of extending competitive rating laws to workers' compensation are entirely correct in giving great emphasis to preserving the integrity of the financial and Unit Statistical Plan data bases. However, proponents of competition do not agree that the quality of reported data need suffer. As noted earlier, even the largest writer of this coverage does not have and could not develop fully credible data for all of the classifications used in most states. While the largest market share is small, workers' compensation looms large on the books of many insurers. For example, although Acuna holds about a 6 percent share of the market, this one line accounts for over 20 percent of its total property/casualty premium volume. An accurate and credible data base is no less valuable to the largest writers of workers' compensation than to the smallest. That dependency, shared by all companies, would do more than any legal requirement to assure the preservation of the data base. Indeed, a credible data base will become more important to all companies as they price the product in a competitive environment that will leave little margin for error on either side of adequacy.

It should be pointed out that we do not now have an entirely reliable data base for workers' compensation. The National Council on Compensation Insurance by virtue of serving members in 31 states has access to more data than any other rating bureau. Yet, it can develop fully credible experience for less than half of its classifications on a state basis. Those who foresee data base problems under competitive rating ignore the problem we already have. And there is no solution to the loss of data that results from self-insurance, a growing problem.

Alleged Impact on Small Insurers and Small Insureds

Opponents of competitive rating for workers' compensation point out that the cost of developing manual rates would fall more heavily on small insurers and place them at a severe competitive disadvantage because the expense would be spread over a smaller book of business. That certainly is true on a theoretical level, but may not prove so in practice.
In testimony before the House Subcommittee on General Over-
sight of the Committee on Small Business, Spencer L. Kimball, Sey-
mour Logan Professor of Law at the University of Chicago, observed: "... the way small companies will survive in a competitive mar-
et (as I think they can) is by finding a particular niche that they can fill better than a larger company that must operate on a less selective basis.”

That opinion, even from so distinguished and independent an
observer of the insurance business, does not constitute empirical
proof that small insurers can function in a competitive environment,
much less promise a guarantee of survival. However, it projects a
future far less bleak than other commentators foresee with an equal
lack of empirical proof. And history shows us that the same dire
predictions proved to be unfounded when automobile and home-
owners insurance were subjected to a competitive market.

Professor Kimball was also skeptical of the claim that small in-
sureds would see workers’ compensation costs rise sharply if insur-
ers were free to charge for expense in accordance with actual cost,
he said that if this proves to be true in a free market, it would indicate
that the insurance mechanism under an administered pricing system
had been used to provide a subsidy to small business. If a subsidy is
needed and desirable, he urged a more direct and explicit way of
providing one—perhaps through tax incentives to offset the cost dis-
advantage of small employers.

In any event, freedom to allocate expense in accordance with
actual cost would seem to argue against the claim that small em-
ployers would be less attractive in a competitive system and that the residual market would grow unreasonably large as a conse-
quence. Rate inadequacy made the residual market swell in the mid-seven-
ties, cost-based pricing should cause it to contract.

Alleged Loss of Commitment to Loss
Control!

Opponents also fear that a free and competitive market will focus
attention on the front-end price. They argue that insurers will reduce
their commitment to loss control in order to gain a competitive ad-
vantage.
This argument overlooks the competitive value of service, particularly the very services that reduce rather than increase costs for buyers. As fire insurance has demonstrated for many years, a competitive market increases the incentives for offering and adopting loss control measures. This suggests that insurers unwilling to provide a high level of loss control services or which delivered inferior service would be out of the competitive running.

That is borne out by current experience. Opponents of competitive rating point out that a measure of price competition is already present in the workers’ compensation market—principally for large policyholders. Yet, it is large policyholders who are the primary focus of loss control programs not only because of economics but also because it is this segment of the market that is somewhat competitive.

One of the great advantages that has come from placing workers’ compensation in the private sector is that accident prevention is a point where the interests of insurers, employers, and employees so clearly intersect. People acting voluntarily and out of self-interest accomplish much more than government can through enforcement programs, or through setting workplace standards that elicit the minimum acceptable performance.

Alleged Difficulty of Reviewing Multiple Manuals

Opponents point out that regulatory review of each company’s manual would be a monumental task. Under the terms of the model act, it would be largely unnecessary because rate approval would not be required. The regulatory focus instead would be on monitoring competition, which is done not by reviewing manuals but by observing the market. This could be accomplished by using various tests of market structure and performance: concentration ratios, changes in market share, entries and exits, profitability, and prices.

System Already Competitive

Opponents of extending competitive rating to workers’ compensation say that the change is unnecessary because the system is already
competitive. Within the context of administered pricing, it is true
that the market has some pricing flexibility. However, the market is
perceived to be less price competitive than other lines of business.

Of course, there are varying degrees of competition, but it seems
doubtful that the self-regulation of free market pricing can harm the
workers’ compensation system. By the same token, it seems unlikely
that with coverage and benefit levels legislatively mandated and that
with regulatory attention redirected to market actions many oppor-
tunities for competitive excesses would occur.

The Case for Competitive Rating

The NAIC moved thoughtfully and carefully in developing the
model open competitive act and in deciding to extend its provisions
to workers’ compensation. A discussion draft was developed by a
subcommittee and subjected to searching examination by an advi-
sory committee and by four task forces. The model act that emerged
from this process has been adopted by the NAIC. There are, of
course, honest differences of opinion as to the pros and cons of such
an important decision, and legislators, regulators, and the industry
have and will continue to weigh these considerations in searching
for a solution.

However, even conclusive proof that open competition could do
no harm to the workers’ compensation system would not of itself be
a good enough reason to change. What are the reasons for change?

First, competitive rating avoids the need for steep price increases
because premium rates promptly can be adjusted, up or down, de-
pending on a carrier’s mix of business, loss experience, and operating
efficiency, as well as the underlying cost trends of the system. Sec-
ond, it should promote more stable markets for employers by sta-
bilizing earnings for insurers. Third, it would enable small employers
to readily share the benefits of competition by comparing prices for
a product standardized by legislation. Economies of scale may keep
them at a comparative disadvantage but less of one than when denied
any effective choice at all. Fourth, it would remove procedures that
make the workers’ compensation system more complex than it need
be, and it could provide the means for reversing the trend towards
self-insurance or fronting arrangements with reinsurancE. Fifth, the
workers’ compensation system stands as a model for the delivery of
social insurance benefits through the private sector at a time when advanced thinkers are considering whether other forms of social insurance might serve the public better if relocated in the private sector. Conversely, it is a short ideological step from mandated benefits, fixed prices, and a perceived cartel to total state control of this and perhaps other forms of insurance as they come to be seen as essential to society.

In a competitive economy, the burden of proof rests on those who advocate government approved prices and government sanctioned and enforced rate-setting agreements. In the author's judgment, these advocates have not proved their case. Indeed, some of their arguments conflict with each other, and others arguably support the case for competition rather than disprove it. Competitive rating has proved itself whenever adopted, and in at least six states shortly will prove that it can also serve all participants in the workers' compensation system.
Competitive Rating in Workers' Compensation Insurance

Michigan's Experience

Robert W. Klein

Abstract

In the following paper, the author evaluates Michigan's experience with competitive rating in workers' compensation insurance. He begins by rejecting the traditional arguments for rate regulation in workers' compensation insurance, arguing that the industry's structure should support workable competition. He then examines Michigan's actual experience with competitive rating in the areas of market structure, conduct, and performance. He finds that, since deregulation, the market has experienced workable competition and good market performance. He further concludes that, on the whole, Michigan employers have benefited from competitive rating.

Introduction

Traditionally, workers' compensation insurance rates have been more closely regulated than rates for any other property casualty...
line. Before 1980, every state which permitted private workers' compensation insurance effectively had an "administered pricing" system; that is, a system where all insurers use uniform rates, filed by a rating bureau, which have received the prior approval of the state insurance department. Some states allowed deviations from bureau rates, and insurers typically retained flexibility with respect to dividends paid to policyholders, but aside from these exceptions, true price competition was essentially nonexistent. Since 1980, however, the concept of competitive rating in workers' compensation insurance has received increased attention. In a "competitive rating" or "open competition" system, rates are not set by a rating bureau or subject to prior approval but are established by market forces. In December 1980, the National Association of Insurance Commissioners (or "NAIC") adopted a model competitive rating act which included workers' compensation insurance. Nine states have since enacted some form of a competitive rating system for workers' compensation. Several other states have considered such a system.1

An important impetus behind competitive rating in workers' compensation insurance has been the heightened effort in many states to lower business costs to promote economic development. Workers' compensation costs have often been identified as a significant area for reform in this effort. Considerable attention has been devoted toward tightening eligibility requirements, and limits have been placed on benefits. At the same time, competitive rating has been considered as a means to promoting efficiency in providing workers' compensation insurance and lowering premiums without impairing the benefits paid to workers.

From a theoretical standpoint, it is difficult to make a strong argument for prior approval regulation of uniform bureau rates in workers' compensation insurance. This line of insurance lacks the structural conditions which are traditionally offered as the basis for price-entrap regulation in other industries.2

1. The only exception is Texas where rates are set by the State Board of Insurance, but the effect is the same as under a bureau rating system.

2. Those states which have instituted competitive rating systems for workers' compensation insurance are Arkansas, Georgia, Illinois, Kentucky, Michigan, Minnesota, Oregon, Rhode Island, and Vermont.

3. Previous articles in this journal have taken both supporting and opposing positions on competitive rating in workers' compensation insurance. Proponents of open competition argue that rates should be set by market forces which they contend will ensure fair and adequate rates, availability of coverage, and flexible pricing re-
Because of the interest in competitive rating in workers' compensation insurance, a detailed examination of one state's experience with it should be of interest to other states contemplating such a system. This article examines in some depth Michigan's experience with competitive rating in workers' compensation insurance since its introduction in 1983. The period examined encompasses the "soft market" conditions that were present in 1983 and 1984 as well as the current "hard market" conditions which emerged in late 1984 and early 1985. The characteristics of the industry should be sufficiently similar across states so that the experience of one state should be relevant to others. The focus here is on the effect of competitive rating in Michigan on market concentration, rates, profitability, and availability. This article draws heavily upon data accumulated for an annual report on the state of competition in the workers' compensation insurance market which is required by the Michigan competitive rating law. The detailed nature of the data required for this report permits an investigation of many of the questions raised by critics of competitive rating.

A detailed analysis of traditional economic theories of competition and regulation is beyond the scope of this article. The first part of this paper evaluates the traditional arguments for regulating workers' compensation insurance rates. The second part examines Michigan's actual experience with open competition in the areas of market structure, conduct, and performance.

Rate Regulation and Workers' Compensation Insurance

Competition is generally considered desirable from society's standpoint because it ensures that resources are being used in the best way possible. An industry is considered perfectly competitive only in response to changing market conditions. Opponents argue that, because of the industry's unique characteristics, open competition will erode the industry's data base, hurt small businesses as well as small insurers, lead to greater price instability, and increase the potential for insolvencies. See Bailey, Competitive Rating and Workers' Compensation, 1 JOURNAL OF INSURANCE REGULATION 1 [1982] (hereafter "Bailey"); Countryman, Open Competition Rating for Workers' Compensation, id., 9 [hereafter "Countryman"]; See also Appel and Gersky, Regulating Competition: The Case of Workers' Compensation Insurance, 3 id. 408 (1985) (hereafter "Appel & Gersky").
when the number of firms selling a homogenous commodity is so large, and each firm's share of the market is so small, that no firm is able to individually affect the price of the commodity by varying its output. In addition, perfect competition requires that there be no barriers to the entry of new firms and that resources be perfectly mobile in and out of the industry. The long-run equilibrium outcome of a competitive market possesses three desirable properties:

1. The incremental or marginal cost of producing the last unit of output will be equal to the price that consumers are willing to pay for it.

2. There will be no "economic" profits. Investors will receive a return just sufficient to induce them to maintain their investment at the level required to produce the industry's equilibrium output efficiently.

3. Each firm will be producing at an output level where its average cost will be at a minimum.

Industrial organization economists postulate a general theoretical relationship between market structure and result, which they refer to as the "structure-conduct-performance hypothesis." The basic hypothesis is the market structure determines market conduct which determines market performance.

Market structure encompasses the number of buyers and sellers and their size distribution, the height of barriers to entry into the market, cost structures, the character of buyer and seller information, and the degree of product differentiation. Market conduct covers the actual behavior of firms in pricing, setting output levels, product design, advertising, innovation, and capital investment.

Market performance refers to price, profit, and output levels, the degree of cost efficiency, and the rate of technological progress.

In these terms, an atomistic market structure and the lack of barriers to entry lead to independent and competitive pricing which results in optimal market performance. Conversely, high market concentration and barriers to entry will tend to result in restraints on competition and suboptimal performance.

We would never expect to find the conditions for perfect competition satisfied in the real world. Many industries have a limited number of firms, considerable product diversity among firms, entry
barriers, informational limitations, externalities, and other institutional impediments to competition. Hence, competition will always be something less than perfect. For this reason, economists have developed the concept of "workable competition" as a practical standard with which to evaluate industries. Markham has proposed that a market is workably competitive when, given its structural characteristics, no governmental intervention can increase social welfare. Indeed, on a practical basis, the critical question that economists and policymakers typically face is this: when can governmental intervention in a market improve its performance and what form should that intervention take?

Economists generally do not disagree on the need for price-entry regulation in the case of natural monopoly. An industry is a natural monopoly when it is subject to continually increasing returns to scale, i.e., average cost continually declines as output increases. Under these circumstances it is more efficient to regulate the prices of one producer than to have a number of producers competing for business. Most industries, of course, are not natural monopolies. Considerable debate has occurred in the academic literature regarding the need for regulation under market conditions other than natural monopoly. Many economists remain skeptical as to the ability of regulation to achieve any societal benefits in such instances. The important question here, of course, is whether regulation of workers' compensation rates serves any public purpose. It is quite obvious that no natural monopoly requires rate regulation in workers' compensation insurance because scale economies in property-casualty insurance generally appear to be moderate if they exist at all.

6. See, for example, J.C. Bonbright, PRINCIPLES OF PUBLIC UTILITY RATES (1951).

7. See, for example, C. Fromm, ed., STUDIES IN PUBLIC REGULATION (1985).
any other basis for regulation of workers’ compensation insurance rates?

Traditional Arguments for Regulation

The traditional reason given for regulated uniform rating in workers’ compensation insurance, as in other property-casualty lines, has been the need to protect solvency.\footnote{9} The argument here is that unrestrained price competition among insurers will result in inadequate rates and endanger insurers’ financial solidity to the point that they will not be able to pay losses which they have contracted to insure. Despite the common acceptance of this argument, there is no evidence that property-casualty insurance is any more subject to “destructive” price competition than any other industry.\footnote{10} Insurance does not require the substantial fixed investment required in some industries which can lead to pricing below average total cost in periods of declining demand. Moreover, no rigorous theoretical argument has been made for rate regulation as a means to ensure solvency. Even if regulators restrain price competition, insurers are still subject to other causes of insolvency, such as poor management or bad investments.\footnote{11} Rate regulation, to the extent that it restrains competition, protects and encourages inefficiency to the detriment of consumers. Rate regulation can also hurt solvency by making it difficult for insurers to raise rates when costs are rising.

It also has been argued that special informational requirements of workers’ compensation insurers necessitate regulation.\footnote{12} Rating bureaus have played a very prominent role in workers’ compensation insurance in terms of the collection of actuarial data and rate setting. The National Council on Compensation Insurance, with the assistance of state regulators, has effectively maintained uniform classifications and rates among workers’ compensation insurers in the majority of states. State rating bureaus have managed similar uniform

\footnotesize{9} See Connynman, note 3 supra, at 9; Jokow, note 8 supra at 392–93.
\footnotesize{10} Jokow, op. cit., supra at 393.
\footnotesize{12} Connynman, op. cit., supra at 11–12, National Association of Insurance Commissioners, Report of the Workers’ Compensation Rating Advisory Committee to the NAC Workers’ Compensation Task Force 21–34 (May, 1982).}
systems in other states with private insurance. The argument is that insurers need actuarial data from as wide a base as possible in order to accurately project losses and expenses. Such data is collected on a uniform basis in order to make it meaningful and usable for all insurers. Uniform rating is also justified on the basis that allowing carriers to charge different rates would impair the comparability of their financial data. Lastly, it is suggested that significant cost savings are achieved through joint ratemaking which especially helps smaller insurers.

Despite its traditional acceptance, an informational basis for regulation of workers' compensation insurance is not persuasive. It is not evident why it is necessary for regulators to force insurers who would find it advantageous to share cost data on a uniform basis should be able to to do so without governmental oversight as is the case in other property-casualty insurance lines.13

Interestingly, in recent years, some have argued that stricter price regulation is necessary in various lines of insurance to protect consumers from excessive rates.14 It has been argued that certain insurance lines suffer from oligopolistic tendencies and significant consumer information problems—a situation that leads to supra-competitive rates in the absence of tight regulation. It has also been pointed out that the McCarran-Ferguson Act's exemption of insurance from federal antitrust prosecution facilitates oligopolistic pricing behavior. The implication is that strict rate regulation can prevent insurers from abusing their market power and force them to charge rates which approximate competitive levels.

But for workers' compensation insurers to possess significant market power, two conditions would have to exist: One, the market would have to be sufficiently concentrated so that insurers could recognize their interdependence and restrain their competition. Second, barriers to entry into the market would have to be sufficiently high to permit incumbents some excess profits before entry would

13. See Bailey, note 1 supra at 6.
occur. Neither of these circumstances appear to be the case in workers' compensation insurance.

There does not appear to be particularly high market concentration in workers' compensation insurance at either national or state levels. Concentration has generally been measured either in terms of "concentration ratios," which represent the combined market share of some number of the largest sellers, or in terms of the Herfindahl-Hirschman Index (the sum of the squares of the percentage market shares of each firm). While neither economic theory nor experience establish a critical level of concentration for the existence of oligopoly in a particular industry, the Justice Department has established merger guidelines for industries which refer to the H-index. According to the guidelines, a market with an H-Index value of less than 1000 is unconcentrated, and therefore mergers would probably go unopposed by the Justice Department. In 1984, the top four insurers accounted for 23.5 percent of the workers' compensation premiums written nationwide while the top eight insurers accounted for 36.8 percent. Appel and Gerotsky calculated an H-Index value of 300 for the workers' compensation insurance market, considerably below the Justice Department criterion for even moderate concentration.

Concentration at the state level can run somewhat higher but not to a point that should generate serious problems for competition. Appel and Gerotsky also calculated concentration ratios and H-Indices for five selected state workers' compensation insurance markets. Of these five states, Illinois was the least concentrated with a four-firm concentration ratio of 25.8 percent and an H-Index of 530. Maine was the most concentrated of the five states with a four-firm concentration ratio of 43.5 percent and an H-Index of 970. These figures, if representative, suggest that concentration, even in smaller state markets, is not high enough to generate a strong probability of oligopolistic behavior.

Entry conditions also appear to be relatively conducive to competition in workers' compensation insurance. The property-liability

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17. Appel & Gerotsky, note 1 supra at 417.
18. Id. at 414-15.
insurance industry generally is not characterized by significant barriers to entry. The initial investment in physical facilities needed to start an insurance company seems relatively minimal compared with more capital-intensive industries. The minimum surplus requirement for licensing in most states is less than $4 million, which is not a significant sum in relation to the premium volume of most insurers. Independent agency companies can essentially plug into the agency network in any given state in order to market their policies. Entry for direct writers is a little more difficult in that they must set up their own agent network to sell their policies in a state. However, both agency companies and direct writers can benefit from "economies of scope" by using the same facilities and personnel to market several different lines of insurance in a state. This greatly facilitates entry into and exit out of a specific line of insurance. 19

It is possible that even with low concentration and entry barriers, significant consumer information problems could result in sub-optimal performance. 20 When consumer information is poor it is possible for firms to sustain supra-competitive prices. But this situation does not necessarily call for rate regulation. Rather, there should be increased efforts to improve consumer information about the market before a regulatory solution is contemplated.

The remainder of this article tests the traditional arguments for regulation in workers' compensation insurance by examining Michigan's actual experience with competitive rating over the last three years. If it is necessary to regulate workers' compensation rates then deregulation should be followed by some evidence of market failure and harm to consumers.

Michigan's Experience with Competitive Rating

The previous recession hit Michigan's economy especially hard because of its strong concentration in auto production and other du-

19. Some empirical support for this assessment of entry conditions is provided by Appel and Gersky who found that the number of workers' compensation insurers nationally has generally moved directly with demand (payrolls) and profitability as would be expected in a competitive industry. Appel & Gersky, op. cit., supra at 415-17.

rable goods. Michigan's civilian unemployment rate rose from 6.9 percent in 1978 to 5.5 percent in 1982.24 The cost of doing business in Michigan came under heavy criticism during this period, particularly those costs associated with workers' compensation. Business leaders claimed that workers' compensation costs were a major factor in the outmigration of manufacturing from the state. It was in the midst of this climate that a number of reforms in Michigan's workers' compensation laws were enacted. The definition of eligibility was tightened, claims of unemployed and retired workers were restricted, and workers' compensation benefits were coordinated with other employer-paid benefits. The objective of these reforms was to rationalize benefits in a way that would lower overall costs but still preserve adequate compensation for injured workers.

At the same time that benefits were reformed, the system for providing workers' compensation insurance to employers also came under scrutiny. Before 1983, Michigan, like most other states, had a uniform bureau rating system for workers' compensation insurance. Rates were subject to prior approval by the insurance commissioner and all insurers elected to use the classification system and rates filed by and approved for the Workers' Compensation Rating and Inspection Association of Michigan (or "WCRIAM"). Insurers could opt to file their own rates individually, but this option was never exercised. Rates were required, by statute, to not be "excessive, inadequate, or unfairly discriminatory." However, some state legislators believed that this system was inefficient and resulted in excessive rates in relation to the benefits paid to workers. Consequently, the Legislature enacted Public Acts 7 and 8 of 1982 which instituted a new rating environment for workers' compensation insurance in Michigan. The new arrangement became effective January 1, 1983. It replaced the previous uniform bureau rating system with a competitive rating system under which each insurer must price on the basis of its own costs and marketing strategy.

The purposes, as stated in Public Acts 7 and 8, are:

- To protect policyholders and the public against the adverse effects of excessive, inadequate, and unfairly discriminatory rates,

• To promote price competition among insurers writing workers’ compensation insurance so as to encourage the lowest possible rates consistent with benefits and with maintaining the solvency of insurers.

• To provide regulatory controls and other activity in the absence of competition.

• To improve the availability, fairness, and reliability of workers’ compensation insurance.

The two Acts seek to accomplish these goals by relying on price competition to effectively regulate rates. The legislation is designed to create and maintain market conditions conducive to competition by

• Allowing insurers to file rates and use them without first receiving approval from the insurance commissioner.

• Prohibiting bureau rate filings. Insurers are required to file their rates individually.

• Allowing insurers to share only that information on loss costs needed to make pricing decisions. Full advisory rates as promulgated by a statistical or advisory organization, are not permitted.

Rates, under the new system, must meet the same regulatory standards but insurers are allowed to file them on a “file and use basis,” that is, rates must be filed prior to their effective date but do not have to be prior approved. Rates can still be subsequently dis-approved if they do not meet statutory standards, and insurers can still request a hearing on any disapproval. As previously, a rate cannot be found excessive unless it is unreasonably high for the coverage provided and there is a lack of competition in the market. Permitting insurers to file and use rates independently without prior approval is considered the qualifying feature of competitive rating statutes. But, the provisions of the Michigan statute regulating bureau activities are more exceptional. The statute abolished the Workers’ Compensation Rating and Inspection Association of Michigan and replaced it with a two-tie arrangement for collection and sharing of loss cost data. This new system consists of a “Designated Advisory Organization” which performs the functions of a statistical agent. It
is appointed and governed by a board of public, industry, employer, and governmental representatives—the “Data Collection Agency.” In fact, WCRIAM was reconstituted as the designated advisory organization and renamed the Compensation Advisory Organization of Michigan (or “CAOM”) in recognition of its revised status. Insurers are required to submit data on their losses, by classification, to the CAOM. The CAOM then compiles and publishes this data in an annual pure premium publication which includes an adjustment for law effect but no adjustments for trend, expenses, or profit. Insurers are expected to develop their own rates using the pure premium publication by loading for their own trend, expense, and profit factors. Special seminars were held prior to implementing the new law to assist company personnel in using the new system.

The purpose of having insurers develop their own rates was to remove all vestiges of the previous bureau rating system. Legislators felt that allowing the promulgation of advisory rates or even the sharing of expense and profit data could induce or facilitate uniform rate setting and thus reduce competition. The NAIC model act contains similar provisions for workers’ compensation insurance except that it allows advisory rates for a two-year transition period following the effective date of the act. This feature of competitive rating statutes has been somewhat controversial. Among states with competitive rating statutes, only Kentucky, Minnesota, and Oregon, along with Michigan, prohibit the sharing of anything more than pure premium data.

The Michigan Insurance Bureau retains a monitoring responsibility to ensure that the forces of competition maintain an efficient workers’ compensation insurance market. Public Act 7 requires the commissioner of insurance to hold a public hearing on competition in the market and to issue both preliminary and final reports every year, certifying to the market’s competitiveness. If the commissioner determines that the market is not competitive, the Act authorizes a number of different actions to rectify the situation including reinstating prior approval rating. The state legislature must approve the commissioner’s final certification for it to remain in effect.

Data from these annual competition reports form the basis for the analysis here of Michigan’s experience with competitive rating. The paper examines the Michigan workers’ compensation insurance market in terms of the structure-conduct-performance hypothesis discussed earlier. First, market structure is analyzed to determine
whether it satisfies the conditions for workable competition. Then, market conduct is examined to ascertain the degree of independence and competitiveness in insurers' behavior with respect to pricing and underwriting. Finally, market performance is evaluated to determine whether it is reasonably efficient and whether competitive rating has benefited or hurt employers.

**Market Structure**

For a market to have workable competition, there must be enough sellers so that no one firm or group of firms is able to arbitrarily set the market price and output. Entry into a competitive market should also be relatively easy so that new firms can come in and lure away customers from firms which are inefficient or which are earning excessive profits. Table 1 shows market shares in terms of written premiums for the 20 leading workers' compensation insurer groups in Michigan in 1985 for the period 1982 through 1985. From the standpoint of assessing competition, insurer group market shares are more relevant than individual company shares because carriers within a group are under one locus of control and generally do not compete with each other.

The leading group, Liberty Mutual, had 8.8 percent market share in 1985. The second leading insurer, the State Accident Fund, had only slightly less written premium. A total of 238 individual companies and 118 groups sold workers' compensation insurance policies in Michigan in 1985. The number of groups is down slightly from 1982 when there were 122 groups. Clearly, there are numerous sellers of workers' compensation insurance in Michigan. Contrary to predictions of its critics, competitive rating has not reduced the number of carriers, indicating that smaller carriers have been able to remain in the market.

There has been some movement among the top insurer groups over the last three years, as Table 1 indicates. Every insurer among the top 10 in 1985 had changed its ranking from 1984. The rise of the State Accident Fund over the entire 1982–85 period has been particularly dramatic. The State Accident Fund was only the 11th largest insurer in 1982. Its ascendency to second place is attributable to its relatively low rate structure and fairly open underwriting policy. Amerisure, Liberty Mutual, and Travelers, which were first, second, and third respectively in 1984, were third, first, and fourth in
### TABLE 1
Michigan Workers' Compensation Insurance Voluntary Market Shares for 20 Leading Groups*
1982–1985

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Liberty Mutual</td>
<td>8.8</td>
<td>7.1</td>
<td>6.6</td>
<td>7.0</td>
</tr>
<tr>
<td>State Accident Fund</td>
<td>8.8</td>
<td>4.8</td>
<td>4.1</td>
<td>3.4</td>
</tr>
<tr>
<td>Amerisure</td>
<td>7.0</td>
<td>7.7</td>
<td>6.6</td>
<td>6.4</td>
</tr>
<tr>
<td>Travelers</td>
<td>5.8</td>
<td>5.1</td>
<td>6.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Citizens</td>
<td>5.1</td>
<td>3.4</td>
<td>3.1</td>
<td>4.1</td>
</tr>
<tr>
<td>Hartford</td>
<td>5.0</td>
<td>4.5</td>
<td>4.7</td>
<td>3.5</td>
</tr>
<tr>
<td>CNA</td>
<td>4.5</td>
<td>5.4</td>
<td>3.9</td>
<td>3.9</td>
</tr>
<tr>
<td>Aetna</td>
<td>4.4</td>
<td>4.7</td>
<td>5.3</td>
<td>4.5</td>
</tr>
<tr>
<td>American Home</td>
<td>3.8</td>
<td>2.4</td>
<td>1.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Wausau</td>
<td>3.2</td>
<td>4.1</td>
<td>3.6</td>
<td>4.2</td>
</tr>
<tr>
<td>CIGNA</td>
<td>2.7</td>
<td>4.6</td>
<td>4.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Home</td>
<td>2.3</td>
<td>3.8</td>
<td>4.0</td>
<td>4.8</td>
</tr>
<tr>
<td>Federal Kemper</td>
<td>2.0</td>
<td>1.7</td>
<td>1.9</td>
<td>2.5</td>
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<tr>
<td>USFIC</td>
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<td>1.5</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Continental</td>
<td>1.6</td>
<td>1.7</td>
<td>1.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Sentry</td>
<td>1.6</td>
<td>1.2</td>
<td>1.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Royal</td>
<td>1.6</td>
<td>1.4</td>
<td>1.7</td>
<td>2.1</td>
</tr>
<tr>
<td>Transamerica</td>
<td>1.5</td>
<td>2.0</td>
<td>1.9</td>
<td>2.1</td>
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<tr>
<td>Crum &amp; Forster</td>
<td>1.5</td>
<td>2.5</td>
<td>1.7</td>
<td>1.0</td>
</tr>
<tr>
<td>Great American</td>
<td>1.4</td>
<td>1.6</td>
<td>1.4</td>
<td>2.1</td>
</tr>
</tbody>
</table>


Source of data: Compensation Advisory Organization of Michigan

1985. Movement in and out of the top 10 was much less significant than movement among the top 10, however. Eight of the top 10 groups in 1982, the year preceding competitive rating, were also among the top 10 in 1985. Hence, there is no indication that competitive rating has had any significant impact on the overall position of the leading carriers.

On the whole, the market is not excessively concentrated among the leading carriers. Table 2 presents concentration ratios and H-Index values on a group basis for the Michigan workers' compensation insurance market for 1980 through 1985. It shows that in 1985, on a group basis, the four-firm concentration ratio was 30.3 percent,
TABLE 2
Michigan Workers' Compensation Insurance
Market Concentration*  
1980-1985

<table>
<thead>
<tr>
<th>Year</th>
<th>CR4</th>
<th>CR8</th>
<th>CR20</th>
<th>H-Index</th>
</tr>
</thead>
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<tr>
<td>1980</td>
<td>25.6</td>
<td>43.1</td>
<td>72.8</td>
<td>347.5</td>
</tr>
<tr>
<td>1981</td>
<td>25.8</td>
<td>43.2</td>
<td>74.1</td>
<td>359.8</td>
</tr>
<tr>
<td>1982</td>
<td>23.6</td>
<td>41.2</td>
<td>71.7</td>
<td>325.5</td>
</tr>
<tr>
<td>1983</td>
<td>25.0</td>
<td>44.1</td>
<td>74.1</td>
<td>352.1</td>
</tr>
<tr>
<td>1984</td>
<td>24.8</td>
<td>42.9</td>
<td>72.8</td>
<td>346.4</td>
</tr>
<tr>
<td>1985</td>
<td>30.3</td>
<td>49.2</td>
<td>74.2</td>
<td>404.3</td>
</tr>
</tbody>
</table>

*1980-81 figures based on manual premium; 1982-85 figures based on standard premium, 1984-85 figures based on standard or actual estimated annual premium.

Source of Data: Compensation Advisory Organization of Michigan

The eight-firm concentration ratio was 49.2 percent, and the 20-firm concentration ratio was 74.2 percent. The group CR index value for 1985 was 404.3 which is considerably below the Justice Department criterion for moderate concentration. It is apparent that concentration has increased since 1982, particularly from 1984 to 1985. The degree of concentration among the leading carriers, while not significant, is not high enough in and of itself to generate serious concerns about competition. The recent increase in concentration is probably attributable to the reenforcement of a number of insurers in the current tight market phase which has caused the market shares of some more active larger carriers to increase. This development may have been exacerbated by competitive rating to the extent that it would enable insurers to pursue different pricing strategies.

Easy entry by new firms can have a tremendous disciplinary effect on incumbent firms even in a highly concentrated industry. It is difficult, however, to quantify precisely entry barriers into a market like workers' compensation insurance. In practice, one would expect both entry into and exit out of the workers' compensation insurance market if there is workable competition. Aggressive competition would tend to result in a shakeout of less efficient firms while low entry barriers would make it easy for new firms to come into the market. Exit and entry data for groups in the Michigan workers' compensation market are shown in Table 3. An insurer is considered to have entered the market in a given year if it sold one or
more policies in that year but did not sell any in the previous year. Likewise, an insurer is presumed to have exited the market in a given year if it did not sell any policies in that year but did sell at least one policy in the previous year. Rates of exit and entry are measured as a percentage of the previous year’s groups.

The figures in Table 3 reveal a fair amount of entry into and exit out of the Michigan market since 1982. The rate of entry has averaged approximately five percent and the rate of exit has averaged approximately six percent. Exits exceeded entries in 1983 and 1985, while entries exceeded exits in 1984. The overall entry and exit do not show barriers and suggest workable competition.

**Market Conduct**

According to the structure-conduct-performance hypothesis, a competitive market structure should result in competitive conduct on the part of sellers. Firms behave competitively when they independently and aggressively seek business by offering the most favorable terms they can to buyers. Competitive conduct is not cooperative behavior aimed at restricting output and fixing prices to raise profits. Hence, if workers’ compensation insurers are behaving competitively, one should see evidence of rate-fixing or other kinds of agreements or concerted action designed to limit competition. Rather, one should see evidence that insurers are independently and aggressively seeking business by offering the lowest rates possible for the kind of coverage and services they are providing.
The evidence on market conduct evaluated here comes primarily from testimony given at public hearings held in the fall of each year on the state of competition in the Michigan workers' compensation insurance market. Three hearings have been held since the onset of competitive rating. Both agents and insurers have testified at these hearings, but no employers have testified, even with the recent rate increases. To compensate, additional anecdotal evidence on market conduct was culled from letters from insureds received by the Michigan Insurance Bureau. The basic focus here is on insurers' pricing and underwriting behavior.

In the first two hearings, held in 1983 and 1984, agents and agents testified to aggressive price competition and dramatic reductions in the premiums paid by employers after the implementation of competitive rating. No carriers complained of difficulties in developing their own rates from the pure premium publications or of any doubts about the quality of the data supplied. It was not uncommon for employers to obtain premium quotations which varied by as much as 50 percent or more among carriers. It was also common for insurers to give the maximum 25 percent schedule credit allowed under Michigan law. It was quite clear that carriers were using schedule rating as a marketing device rather than strictly as a device to reflect special circumstances which would affect an insured's experience. The sharp drop in premiums induced a number of previously self-insured employers to purchase their insurance in the market. Although such a development was encouraging, it could not be attributed solely to competitive rating. The entire commercial lines market was undergoing a very competitive phase during this period which undoubtedly had some impact on pricing for workers' compensation insurance in Michigan.

The impact of the national underwriting cycle was reflected in an increase in rates and a reduction in schedule credits in 1985.22

22. According to figures supplied by the Michigan Department of Labor, the number of individually self-insured employers decreased from 705 in 1982 to 620 in 1985. The number of group self-insured employers increased from 4,603 to 6,664 over this period, but so did the total number of employers. Unfortunately, accurate figures on the total number of covered employers are not available to calculate the percentage of self-insured employers.


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Insurance company representatives testifying at the 1985 public hearing acknowledged that workers' compensation insurance rates had risen in Michigan in the past year as they had countrywide. Those testifying pointed out that, in 1983 and 1984, insurers were anxious to gain market share and lure employers away from other carriers. Consequently, intensified competition reduced rates below what was adequate for the risks assumed. Declining interest rates also reduced revenues from investment income. Taken together, these developments reduced significantly insurer's surplus, forcing increased rates in 1985. During 1985 and the first half of 1986, several employers complained to the Insurance Bureau about premium increases in the area of 20 to 40 percent due to an increase in the manual rate schedule of their carrier and the reduction or elimination of their schedule credit. Fortunately, in some cases, employers were able to avoid paying large premium increases by shopping around and finding a lower price carrier. Other employers, however, because of their type of business or loss experience, were unable to find coverage with another carrier in the voluntary market. Hence, the ability to shop around has definitely helped some, but not all, employers avoid paying large premium increases. This activity, of course, would diminish the overall impact of manual rate increases and schedule credit reductions on the average premium paid.

Industry representatives stated that, despite recent rate increases, there was still active price competition in the market for both small and large accounts. They cited a number of instances where their company was underbid on its premium quote to a prospective insured. Insurers pointed out their tendency to price more competitively in those classes in which they tended to specialize because of their experience in underwriting and servicing certain types of businesses. One insurer stated that although it would never discontinue writing other classifications in which it did not specialize, it was interested in developing those areas which it believed would be profitable in the future.

The availability of workers' compensation coverage has also followed a cyclical pattern in Michigan. Agents testified to a significant improvement in availability in 1983 and 1984. Several employers previously relegated to the placement facility were able to obtain insurance in the voluntary market at competitive
rates. This situation changed dramatically in 1985. Employers contacting the Insurance Bureau in 1985 and 1986 have complained of increased availability problems. Some who had received cancellation or nonrenewal notices were unable to find reasonably priced coverage in the voluntary market and were forced into the placement facilities. Other employers who received large premium increases on their renewals were unable to find less expensive coverage in the voluntary market. Even those employers who were able to switch to lower price carriers indicated that it was much more difficult to find a carrier who would write them a policy than in previous years. An insurer who testified at the 1985 hearing acknowledged that it was not seeking business as aggressively as it had previously. It indicated that its desire to maintain a safe premium to surplus ratio was limiting its ability to write new business.

Taken together, the evidence on market conduct reveals the influence of the underwriting cycle on the pricing and underwriting behavior of workers' compensation insurers in Michigan. Two years of rather aggressive price competition and rate decreases after deregulation have been followed by a year and half of rate hikes and restrictions underwriting. These developments mirror the movement of the underwriting cycle in the national commercial lines market. Clearly, competitive rating facilitated the aggressive price competition that occurred in 1983 and 1984 by allowing insurers to lower rates independently. Insurers contend that this, along with declining investment income, resulted in inadequate rates and reductions in surplus which in turn necessitated rate increases and underwriting restrictions. Even now, in the current tight market phase, insurers continue to argue that price competition is still strong, as evidenced by the loss of accounts to competitors and the significant disparity in rates. It appears that competition has helped to restrain premium increases for some employers who have shopped around. Based on this evidence, there is no indication that conduct in the Michigan workers' compensation insurance market is not reasonably competitive, although it is clear that insurers are pricing more conservatively than in 1983 and 1984.

34. Employers who cannot obtain voluntary coverage can obtain insurance through the Michigan Workers' Compensation Insurance Placement Facility which was established by P.A. 8 of 1982.
Market Performance

According to economic theory, a competitive market will achieve an optimal allocation of resources. Specifically, this means that the market price will equal the production cost of the last unit of output, each firm will produce at a level of output where its average cost is at a minimum, and investors will receive a rate of return just equal to the cost of the capital they have invested. In effect, a competitive market structure causes firms to behave competitively which in turn leads to “good” market performance. If the Michigan workers’ compensation insurance market does have a workable competition its performance should reasonably approach that which would be achieved under perfect competition.

Somewhat comparable figures on the number of policies, written premium, covered payroll, and average rates in the Michigan workers’ compensation insurance market for the period 1982–85 are offered in Table 4. Figures for 1982–83 were obtained from unit statistical cards. Data for 1984–85 were estimated from policy declarations which means they will differ marginally from final figures determined after payroll audits. Premiums dropped by 14.2 percent from 1982 to 1984 despite an increase in covered payroll over this period. This trend was reversed in 1985 with estimated premiums increasing by $77 million over 1984. The increase in total premiums is not surprising because many insurers have increased their rates and decreased their use of schedule credits. At the same time, estimated policies and insured payroll increased in 1985, which would also have a positive effect on total premiums. A discussion of movement in the average rate is deferred until later.

Variation in Pricing. There has been substantial interest in the degree of pricing variation that has occurred since competitive rating was begun. There was concern that insurers would continue to fix rates in some manner even with the abolition of the cartel rating system. Arguably, a substantial degree of variation in pricing would indicate a lack of price-fixing and the presence of price competition. The paradox here is that one would also expect uniform pricing in a perfectly competitive market—all firms would be charging the lowest possible price. Although significant pricing variation would not indicate price-fixing, it would not necessarily imply that the market
<table>
<thead>
<tr>
<th>Year</th>
<th>Premiums* (000s)</th>
<th>%roll (000s)</th>
<th>Average Rate** (Per $100)</th>
</tr>
</thead>
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<tr>
<td>Voluntary Market</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td>120,097</td>
<td>$589,383</td>
<td>$23,833,407</td>
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<tr>
<td>1983</td>
<td>126,310</td>
<td>572,079</td>
<td>26,649,607</td>
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<tr>
<td>1984</td>
<td>138,641</td>
<td>507,312</td>
<td>26,450,110</td>
</tr>
<tr>
<td>1985</td>
<td>153,902</td>
<td>550,444</td>
<td>26,547,992</td>
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<td>Placement Facility</td>
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<tr>
<td>1982</td>
<td>12,290</td>
<td>20,686</td>
<td>614,531</td>
</tr>
<tr>
<td>1983</td>
<td>10,385</td>
<td>17,932</td>
<td>426,748</td>
</tr>
<tr>
<td>1984</td>
<td>10,476</td>
<td>16,303</td>
<td>404,371</td>
</tr>
<tr>
<td>1985</td>
<td>15,313</td>
<td>50,205</td>
<td>1,279,062</td>
</tr>
<tr>
<td>Total</td>
<td>133,387</td>
<td>609,969</td>
<td>24,448,028</td>
</tr>
</tbody>
</table>

*1982-83: Standard premium obtained from unit statistical reports.
1984-85: Total estimated annual premium obtained from policy declarations.
**Premiums/Rate/Payroll/200
Source of Data: Compensation Advisory Organization of Michigan

was competitive either. On the one hand, rate variation in workers' compensation insurance may be necessary because the "product" offered by different carriers is not homogeneous. In other words, the market may be "monopolistically competitive." On the other hand, price dispersion may stem from poor buyer information about the market and reflect suboptimal market performance. Hence, pricing variation alone tells little about competition or the market's performance.

With these considerations in mind, data was obtained on the variation in manual rates. In 1983, 1984, and 1985 the manual rates
charged by 47 insurers in 100 classifications were surveyed to determine the degree of variation in rates. These surveys revealed a great deal of variation in carriers' rates. It was not unusual for the high rate in a classification to be more than double the lowest rate. Among classifications, the coefficient of variation (the standard deviation divided by the mean rate) ranged from 10 percent to 30 percent. The average coefficient of variation for all classifications increased from 13.1 in 1983, to 14.7 in 1984, to 16.7 in 1985, indicating an overall increase in the degree of price variation. These data corroborate the anecdotal reports of substantial differences in insurers' premium quotations and clearly do not indicate that insurers have maintained uniformity in their pricing since deregulation. Interestingly, there was greater variation in pricing in 1985 when the market was tightening than in previous years when the market was more competitive. The reason may be that only a portion of insurers had implemented rate increases at the time of the 1985 survey, which would tend to increase the degree of rate variation.

The fact that employers with similar operations could pay such a variety of prices could indicate a market failure. In the long run, competition should cause prices for a homogeneous commodity to converge around a level just sufficient to enable an efficiently run company to earn a fair return on investment. Here it appears to be the case that for any given classification some employers are paying much higher manual rates than others.

There are several possible explanations for this situation which would not imply a failure of the market, however. It is possible that differences in manual rates among carriers are substantially offset by differences in policies towards schedule credits, experience rating, premium discounts, and other rating adjustments. A second explanation is that workers' compensation insurance is not a homogeneous commodity. Carriers with higher rates may offer additional services that lower-price carriers do not provide. Experience-rating and schedule-rating may also not fully accommodate insureds of varying riskiness. Hence, it is common for insurers to use preferred and standard carriers with different rates within the same group for this purpose. Third, some variation in pricing is not unexpected in

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A market which is continually subject to varying external forces which require adjustments by producers. Finally, as some insurers have testified, the practice of target-pricing certain classifications for competitive reasons might result in greater variation in carriers' "posted" rates than that reflected in the rates that employers actually pay. None of the above explanations are necessarily inconsistent with reasonable competition. However, it should be pointed out that additional surveys still revealed significant variation in the manual rates actually paid by employers on policies purchased in 1984 and 1985.26 Hence, target-pricing by carriers is not the only explanation for price dispersion under deregulation.

A less benign reason for the variation in rates charged may be that employers lack adequate information about the market. There is considerable economic literature on the link between imperfect buyer information and price dispersion.27 Joskow, among others, has commented on the information problem confronted by insurance buyers and its potential adverse effect on market performance.28 A theoretical discussion of the possible link between poor buyer information and rate variation in workers' compensation insurance is beyond the scope of this article. It is reasonable to speculate, however, that some insurers could take advantage of poor buyer information by following a high price strategy, charging supracompetitive rates to employers who are not knowledgeable about lower price carriers. While this behavior would not constitute an attempt to fix prices in a traditional sense, it is a public policy concern if some employers are paying more for their coverage than necessary.

There has been particular concern that small employers would be especially vulnerable to this kind of problem because they have fewer resources to survey the market and lesser bargaining power with insurers. However, Hunt, in a study of the Michigan workers' compensation market in 1983, found no substantial difference in the cost of insurance between small and large employers.29 The Michigan Department of Commerce, with the assistance of the Insurance

27. See YARAS, note 20 supra at 231-47.
28. See Joskow, note 8 supra at 404-45.
Bureau and the Michigan Department of Labor, is undertaking efforts to improve consumer information in workers' compensation insurance. It is hoped that the results of these efforts will be a significant improvement in employers' ability to shop for competitively-rated coverage.

Rate Level and Profitability. Since the inception of competitive rating, there has been continual interest in changes in the overall rate level in the Michigan workers' compensation insurance market. It is possible to measure changes in the rate level under competitive rating in different ways, each approach revealing somewhat different information about the market.

Manual Rate Level Change. One approach is to measure the overall change in the manual rates charged by insurers in the various classifications. The overall manual rate level changes filed by each carrier can be averaged to approximate the overall manual rate level change for the market as a whole. This approach shows movement in the "listed" or "posted" manual rate level. A survey of rate filing for the top 20 carriers in Michigan revealed average manual rate level decreases of 5.6 percent in 1983 and 3.5 percent in 1984. These reductions followed a 22 percent decrease in bureau rates in 1982 that had been prompted by legislative action. Conversely, manual rates rose by approximately 11.5 percent in 1985. According to a survey of other states conducted by the Michigan Department of Commerce, this increase is somewhat less than the 15.5 percent rate increase which was experienced nationally in 1985. It is apparent that, in Michigan, the market began to turn in the middle of 1984. A number of carriers filed rate decreases in the beginning of 1984 but filings in the latter part of 1984 were for rate increases. These figures corroborate the general reports of rate increases and the overall perception of a tightening market.

A problem with the above measure is that it only reflects changes in the manual rates filed by carriers and does not reflect policy changes towards schedule credits and other adjustments of the manual premium. It also will not indicate the manual rates or net premiums that employers are actually paying. If employers are shifting their business to carriers with lower rate structures, then the indicated "listed" rate level change will overstate the change in the rates that are actually being paid by employers. These consid-
erations, of course, only arise with a competitive rating system in which carriers can charge different premiums for the same policy.

Change in the Average Net Rate. An alternative way of measuring the rate level is simply to divide written premiums by covered payroll. This measure shows the actual premiums that employers are paying for their workers’ compensation insurance in relation to their payroll. In this respect, it will reflect change in schedule credits and other adjustments to the manual premium as well as the extent to which increasing rates have caused employers to seek lower price insurers. The average rate per $100 of payroll is shown for the period 1982–85 in Table 4. The data reveal that, from 1982 to 1984, the average rate for all policies declined by 22 percent, from $2.50 to $1.95. However, in 1985, the average rate increased by 10.8 percent to $2.16. This confirms that on the whole employers are paying somewhat higher premiums. It should be noted, however, that a shift in the distribution of payroll among lower and higher rated classifications could also affect the average rate. This latter possibility was tested for a sample of classifications, but there was no evidence of such a shift.

Hunt, Krueger, and Burton (hereafter “Hunt et al.”) have also estimated the average net rate paid historically by Michigan employers for workers’ compensation insurance compared with that paid in other states.30 Their estimates for selected years between 1958 and 1984 are shown in Table 5. The average rates shown were calculated from the actual rates charged in 44 classifications in the various states, weighted by the distribution of insured payroll among these classifications nationally, and adjusted for the estimated effects of expense constants, experience rating, schedule credits, premium discounts, and dividends.31 These rates represent the estimated actual net cost of workers’ compensation insurance to employers in relation to their payroll.


31. Estimates of these factors on the net cost to employers in the various states were based partly on statutory provisions and partly on historical data.
The estimates of Hunt, et al. indicate that, over the period 1958–78, the workers' compensation rates paid by employers increased at a faster pace in Michigan than in the rest of the country. In 1958, workers' compensation rates in Michigan were lower than in other Great Lakes states and the rest of the country. However, over the period 1958–78, rates increased by 420 percent in Michigan compared with 248 percent in surrounding states and 230 percent nationally (using a sample of 28 states). In 1978, Michigan rates were estimated to be 48 percent higher than rates in other Great Lakes states and 33 percent higher than the national average. From 1978 to 1984, however, the upward climb in rates was reversed, more so in Michigan than in other states. The average rate in Michigan declined by 32.1 percent over this period compared with a 16.6 percent decline in Great Lakes states and only a 3.7 percent decrease nationally. The consequence was that by 1984 Michigan's average rate came much closer to the average rate for Great Lakes states and fell below the national average.
Hunt, *et al.* attribute Michigan's improved rates primarily to competitive rating. They estimated the effect of competitive rating on workers' compensation rates in Michigan by simulating the rates that would have been in effect under the old bureau system and comparing those rates with estimates of the rates that employers actually paid. According to their best estimates, using a sample of 71 classifications, competitive rating caused rates to be 28.2 percent lower in 1985, 30.6 percent lower in 1984, and 20.3 percent lower in 1985.\textsuperscript{26} Their estimates of the impact of competitive rating in other states in 1984 ranged from a 1.8 percent increase to a 36.3 percent reduction in the average net rate.\textsuperscript{27} Hunt, *et al.* point out that these estimates are tentative and somewhat sensitive to assumptions regarding dividends and other premium adjustment factors.\textsuperscript{28} Indeed, their estimates of the impact of competitive rating for 1983 and 1984 may be somewhat high because of their use of historical data to estimate the net rates that would have been paid under the old bureau system. The rates that employers would have actually paid under the old system may have been somewhat lower than the estimates because of the "soft" conditions of the national commercial insurance market during 1983–84. It will be some time before more accurate estimates can be made of the effect of competitive rating on rates in Michigan. Still, the estimates of Hunt, *et al.* do suggest that competitive rating has had a significant downward effect on rates for workers' compensation insurance.

Rate changes by themselves, however, while of considerable interest to participants in the market, do not tell much about the market's performance. The relationship of price to cost and the rate of return on investment are much more critical. As stated above, in a perfectly competitive market, price equals marginal cost, including the cost of capital, and excess profits are absent. Likewise, in a workers' compensation insurance market with workable competition, premiums would be no higher than the necessary to cover costs and provide a fair return on investment. Essentially, rates should move with projected changes in the pure premium. Rate changes in any

\textsuperscript{26} Hunt, *et al.* at 27.

\textsuperscript{27} Id. at 34–37.

\textsuperscript{28} Hunt *et al.* developed alternative estimates of the effect of competitive rating using different assumptions about dividends and other premium adjustment factors, but their basic findings remained unchanged.
given year, however, will also be affected by whether premiums in the previous year were adequate. In this context, rate increases are justified if current rates are not sufficient to cover costs. Conversely, rates should decline if they are excessive in relation to costs.

Loss Ratios. Unfortunately, it is difficult to calculate a meaningful rate of return on investment measure on a by-line, by-state, basis because most insurers sell insurance in more than one line and in more than one state. Alternatively, the statewide loss ratio (incurred losses divided by earned premiums) can serve as a useful index of the market's overall loss protection received for each premium dollar paid. The portion of premiums not paid out in losses is available for expenses and profits. All else equal, higher loss ratios suggest greater cost efficiency or decreased profitability. Lower loss ratios imply decreased cost efficiency or increased profitability. Higher loss ratios would be the expected result of an increase in competition and lower rates and lower loss ratios would be the expected result of less competition and higher rates.

Calendar year loss ratios for 1978 through 1985 are shown in Table 6 for Michigan and six other industrial states. The calendar year loss ratio for Michigan increased from .550 in 1982 to .626 in 1984 but fell to .833 in 1985. Loss ratios in other states in the region also increased from 1982 to 1984 and fell in 1985. Although loss ratios have generally been higher in these other states, the gap between them and Michigan has narrowed until, in 1985, Michigan's loss ratio exceeded the average for the other states.

These figures show a significant decrease in profitability and a significant increase in efficiency in the Michigan workers' compensation insurance market since the introduction of competitive rating. The fact that loss ratios have risen in Michigan in relation to other states provides further evidence that competitive rating has lowered the price of workers' compensation insurance to Michigan employers. Of course, historical comparison of loss ratios is valid only to the extent that there has been no change in expense and investment income factors.

It should also be pointed out that the calendar year loss ratios above do not reflect any dividends paid to policyholders from premiums would cause those loss ratios to be higher. The expectation is that increased price competition among insurers would result
TABLE 6
Michigan Workers’ Compensation Insurance
Calendar Year Loss Ratios*  
1978–1985

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Michigan</td>
<td>.833</td>
<td>.862</td>
<td>.787</td>
<td>.550</td>
<td>.636</td>
<td>.605</td>
<td>.585</td>
<td>.749</td>
</tr>
<tr>
<td>Illinois</td>
<td>.919</td>
<td>1.005</td>
<td>.856</td>
<td>.726</td>
<td>.691</td>
<td>.716</td>
<td>.881</td>
<td>.871</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>.801</td>
<td>.705</td>
<td>.606</td>
<td>.683</td>
<td>.695</td>
<td>.714</td>
<td>.756</td>
<td>.773</td>
</tr>
<tr>
<td>Indiana</td>
<td>.812</td>
<td>.822</td>
<td>.810</td>
<td>.700</td>
<td>.708</td>
<td>.608</td>
<td>.652</td>
<td>.682</td>
</tr>
<tr>
<td>Minnesota</td>
<td>1.067</td>
<td>1.336</td>
<td>.853</td>
<td>1.024</td>
<td>1.032</td>
<td>.898</td>
<td>.871</td>
<td>.997</td>
</tr>
<tr>
<td>New York</td>
<td>.761</td>
<td>.857</td>
<td>.890</td>
<td>.825</td>
<td>.682</td>
<td>.619</td>
<td>.524</td>
<td>.689</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>.719</td>
<td>.837</td>
<td>.737</td>
<td>.729</td>
<td>.667</td>
<td>.668</td>
<td>.750</td>
<td>.834</td>
</tr>
<tr>
<td>Above states, excluding Michigan</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Michigan</td>
<td>.810</td>
<td>.909</td>
<td>.813</td>
<td>.783</td>
<td>.715</td>
<td>.683</td>
<td>.745</td>
<td>.804</td>
</tr>
</tbody>
</table>

*These calendar year loss ratios are incurred losses including the effect of assessments on losses and excluding loss adjustment expense divided by net earned premiums.
**Based on preliminary data—some carriers may not be included.

Source of Data: National Council on Compensation Insurance

in reduced dividends to policyholders which would reduce the net benefit to employers. However, annual statement data show that, from 1983 to 1985, dividends decreased only slightly from 12.1 to 11.4 percent of the previous year’s earned premiums.85 Hence, it appears that competitive rating has had, at most, a small effect on dividends in Michigan.

Solvency. There has also been some concern about the effect of competitive rating on solvency. Unfortunately, this is difficult to determine directly because most insurers’ overall financial condition is affected by their performance in other lines besides workers’ compensation and in other states besides Michigan. Obviously, the decrease in profitability of workers’ compensation insurance over the last three years, as indicated by higher loss ratios, in and of itself,

85. Dividends paid to policyholders in a given year are properly attributed to premiums earned in the previous year. The dividend rate for 1985 was based on data obtained from the top 20 carriers (in 1984) since total market figures for 1985 are not yet available.
has had a negative effect on surplus. This does not mean, however, that insurers’ solvency has been significantly impaired by competitive rating in workers’ compensation. Indeed, no insurer has been placed into receivership or otherwise been restricted in Michigan because of its writings in workers’ compensation insurance. Ultimately, competitive rating should only significantly impair solvency if it somehow forced or induced insurers to offer rates considerably below costs for a lengthy period of time. There is no evidence that this has been the case in Michigan. Moreover, competitive rating should make it easier for insurers to increase their rates when it is necessary for whatever reason. In fact, insurers in the past two years have been able to increase their rates for workers’ compensation when they concluded that their rates were not sufficient to cover their costs.

**Availability.** Availability of coverage is the last aspect of the performance of the Michigan workers’ compensation insurance market that is evaluated. Ideally, insurers should be willing to offer any employer coverage at a fair market price. In practice, of course, some businesses have been unable to obtain coverage in the voluntary market and must rely upon the placement facility. There are instances where insurers believe that they cannot adequately price a business under their existing rating system. This should happen less often if insurers enjoy increased pricing flexibility under competitive rating, but some residual market placements are probably inevitable even with workable competition.

At the same time, however, there are concerns about “redlining” against certain types of employers or geographic areas. “Redlining” refers to instances where businesses are unable to get coverage or can only obtain it at an exorbitant price because of an unsupported bias by insurers or a conscious attempt to engage in price discrimination to inflate profits. This kind of activity is inconsistent with workable competition. A good indicator of availability is the size of the “residual market,” that is, that portion of employers who cannot obtain coverage from an insurer on a voluntary basis but must obtain coverage through the placement facility. Table 7 shows the percentage of policies, premiums, and payroll insured through the Michigan Workers’ Compensation Insurance Placement Facility for the period 1980–85. Table 7 reveals a declining residual market share from 1980 to 1984, particularly in terms of payroll. It is apparent that
### TABLE 7
Michigan Workers' Compensation Insurance
Percentage of Policies, Premium, and Payroll
in the Placement Facility
1980-1985

<table>
<thead>
<tr>
<th>Year</th>
<th>Policies</th>
<th>Premium*</th>
<th>Payroll</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>9.8</td>
<td>4.6</td>
<td>4.1</td>
</tr>
<tr>
<td>1981</td>
<td>10.2</td>
<td>3.6</td>
<td>3.3</td>
</tr>
<tr>
<td>1982</td>
<td>9.3</td>
<td>3.4</td>
<td>2.5</td>
</tr>
<tr>
<td>1983</td>
<td>7.6</td>
<td>3.0</td>
<td>1.6</td>
</tr>
<tr>
<td>1984</td>
<td>7.0</td>
<td>3.1</td>
<td>1.5</td>
</tr>
<tr>
<td>1985</td>
<td>10.1</td>
<td>8.4</td>
<td>4.6</td>
</tr>
</tbody>
</table>

*1980-81 figures are manual premium from unit statistical reports; 1982-1983 figures are standard premium from unit statistical reports; 1984-1985 figures are total estimated annual premium from policy declarations.

Source of Data: Compensation Advisory Organization of Michigan

Insurers were seeking business aggressively during this period, enabling many employers to get out of the placement facility. In 1985, however, there was a sharp boost in the number of facility placements and the residual market share. These data confirm both consumer reports of increased difficulty in finding voluntary coverage and the general perception that availability has decreased in the current market. How competitive rating is affecting availability in Michigan is unclear. If competition is acting to suppress rate increases, there may be a negative effect on availability because insurers would find fewer risks desirable at lower rates. The availability of workers’ compensation insurance countrywide also has followed a cyclical pattern. However, the ratio of assigned risk plan premiums reinsured in pools administered by the NCCI to direct voluntary market premiums was 8 percent in 1983, 4.6 percent in 1983, 5.5 percent in 1984, and 9.7 percent in 1985. Hence, Michigan’s experience with availability does not seem to have been atypical.

There has been a concern that under competitive rating availability problems for small employers would be greater than for large employers. The implication is that smaller employers would be less...
able to search out market alternatives or receive special protection under administered pricing systems which would be eliminated under competitive rating. Some indication of this is provided by Table 7 in that it shows that the placement facility insures a higher percentage of policies than payroll. Also, the percentage of payroll insured in the facility has fluctuated more widely over time than has the percentage of policies. This implies that smaller employers have a greater probability of being in the facility and are more likely to stay there when it is being depopulated.

Further indication of the relative degree of availability for different-size risks is provided by Table 8 which shows the relative participation in the Michigan placement facility by premium size for the years 1982 through 1985. Relative participation is measured by dividing the percentage of policies in the placement facility for a particular premium-size category by the percentage of policies for that category in the voluntary market. A ratio higher than one indicates “over representation” or a higher market share in the placement facility than in the voluntary market.

Table 8 reveals that the smallest risks have tended to account for a larger share of the facility business than their share of the voluntary market. It is not apparent that competitive rating had any particular impact on the relative participation of smaller and larger risks in the facility, for 1982 figures are fairly comparable to 1983.

### TABLE 8

<table>
<thead>
<tr>
<th>Michigan Workers' Compensation Insuranc: Placement Facility/Voluntary Risk Policy Ratios by Premium Size*</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-500</td>
</tr>
<tr>
<td>501-1,000</td>
</tr>
<tr>
<td>1,001-5,000</td>
</tr>
<tr>
<td>5,001-10,000</td>
</tr>
<tr>
<td>10,001-50,000</td>
</tr>
<tr>
<td>50,001-100,000</td>
</tr>
<tr>
<td>Over 100,000</td>
</tr>
</tbody>
</table>

*Percentage of total placement facility policies divided by percentage of total voluntary policies.

Source of Data: Compensation Advisory Organization of Michigan
and 1984 figures. However, in 1985, the relative participation of larger risks increased. A possible explanation is that there was a higher proportion of marginal risks among larger employers who had still been able to obtain voluntary market coverage prior to 1985. When the current tight market took effect these risks would be especially vulnerable to being forced into the facility. This evidence indicates that even though availability has worsened generally, smaller employers have not been affected more adversely in this respect than large employers. Rather, it appears that availability for larger employers is more sensitive to market conditions than that for smaller employers.

Conclusion

Aside from the current availability problems, all indications suggest that competitive rating has worked very well in Michigan. There is no evidence that on the whole, employers have been hurt by competitive rating. Rather, it appears that competitive rating has significantly lowered the cost of workers' compensation insurance for employers. Michigan insurers responded to the new rating system with aggressive price competition during its first two years. While rate levels rebounded with the recent turn in the underwriting cycle, it appears that competition may have slowed the overall increase in rates in Michigan.

Structurally, the workers' compensation insurance market in Michigan appears very conducive to competition. Although the level of concentration among the leading carriers is significant, it is not high enough to restrain price competition markedly unless there were other factors that would strongly facilitate such behavior. Rather, entry barriers to the market are also relatively low and there are a large number of insurers operating in the market. The overall rate of the entry and exit suggests a reasonable degree of competition. These factors, along with the statutory provisions against advisory rates, create a supportive environment for competition. Both large and small insurers have been able to survive in this competitive environment, although there has been some increase in concentration. Competitive rating may have facilitated the increase in concentration by allowing larger insurers to retain more competitive pricing strategies while smaller insurers retrenched. Of course, one would ex-
Actuarial Pricing and Insurance Markets

Post concentration to increase under competitive rating if smaller employers were less efficient.

Consistent with these structural conditions, conduct in the Michigan workers' compensation insurance market appears to be very competitive. There is no evidence of price-fixing or any other attempts to restrain competition. Insurers have reported no particular difficulty in calculating their own rates based on the pure premium publications, nor have they expressed doubts about the quality of the data being supplied to the CAOM. Although insurers have raised prices and restricted underwriting in 1985, they appear to be doing it independently as the result of perceived inadequate rates in previous years and diminished surplus rather than a concerted attempt to raise prices to excessive levels. There still appears to be aggressive bidding for risks within this context. The most interesting finding is the indication that competition is acting to restrain the current upswing in premiums. Michigan employers have responded to rate increases by shopping around for lower price carriers, thus limiting the effect of such increases on premiums paid as well as reducing insurers' incentive to post rate increases.

The performance of the Michigan workers' compensation insurance market also has improved significantly since introduction of competitive rating. Between 1982 and 1984, rates declined, and the market loss ratio increased at a greater pace in Michigan than in the rest of the country. In 1985, rates increased, but less so in Michigan than in the rest of the country. At the same time, dividends in Michigan appear to have dropped off only slightly despite the decline in profitability. While conditions in the national commercial lines market clearly have affected pricing for workers' compensation insurance in Michigan, the estimates of Hunt, et al. indicate that competitive rating has reduced significantly the workers' compensation premiums paid by Michigan employers.

Some might suggest that the Michigan experience provides evidence that competitive rating increases pricing instability. To some extent this may be true if open competition caused insurers to price below costs. However, this behavior does not appear to be pathological for rates did rebound in the past two years. More important, if competitive forces prevent rates from reaching excessive levels in the current market phase, these employers will not be affected adversely.
However, the scenario with respect to availability has not been as favorable. Participation in the placement facility declined from 1982 to 1984 but rebounded in 1985 to above 1982 levels. By keeping a lid on rates, competition may be exacerbating the current availability problem. At the same time, national figures on residual market participation indicate that Michigan’s experience is not atypical. As their surpluses are restored through rate increases, insurers should be induced to increase their volume and depopulate the residual market. There is no evidence to suggest that smaller employers have been especially hurt by competitive rating either in terms of rates or availability.

This article does not address all of the questions that competitive rating raises. One interesting question that could not be discussed here is the significance of preventing the promulgation of advisory rates. This type of question would be more appropriately addressed by a multi-state study of the effects of competitive rating. Another question which could not be adequately addressed is the quality of the data being supplied to the CAOM. Although all Michigan carriers have filed the same class plan, at this time it is not possible to determine the degree of adherence to the plan. More generally, the period of experience with competitive rating is not very long in Michigan or in any other state. Some time must pass before more definitive assessments can be made of its impact. It should also be pointed out that the effect of competitive rating in a given state will depend on the stringency of previous regulation and other specific factors. Still, other states should be encouraged by the Michigan experience with competitive rating.
Introduction


The casualty actuary's major task is the proper pricing of insurance products. In other industries, products are priced by mark-ups on cost, with appropriate consideration of supply and demand constraints. For instance, if costs are $1,000 for a product, and the firm desires a 10% mark-up, it may set an initial price of $1,100, and it will raise or lower this price based on marketplace competition.

Insurance pricing differs in three respects:

- The policy costs are not known when the insurance product is priced. The policy is a promise by the insurance company to pay claims in the future. The actuary must estimate these expected future costs when pricing the policy.¹
- In other industries, product prices may be changed on short notice, as market considerations require. Insurance premium rates in most jurisdictions must be filed with the states, and often approved by the state regulators prior to being used. The casualty actuary must often prepare a detailed justification for any rate revision.

¹. Two additional characteristics of insurance products further complicate this process.
- First, the actual costs of two identical policies may not be the same, since losses may be incurred on one policy but not on the other. The actuary can estimate only the expected costs of a policy, not the actual costs.
- Even if the actuary correctly estimates expected costs for a block of business, the actual costs for this business may differ greatly. For instance, Homeowners insurance in the Gulf Coast states is subject to the vagaries of Atlantic hurricanes. Actual losses depend on meteorological happenstance and weather patterns each year.

In other words, not only must the casualty actuary forecast future costs, but these costs are stochastic estimates subject to random loss occurrences.
• In many casualty lines of business, such as workers’ compensation or general liability, there is a long lag between the collection of premium and the payment of claims. The casualty actuary must consider not just the dollars of premiums collected and of losses or expenses paid, but also the time value of money and the payment patterns of each cash flow.

Casualty actuaries have long dealt with the first two of these three characteristics. But when Griffin, Jones, and Smith wrote their JIR paper, the third of these characteristics was stirring continual debate within the actuarial community. Traditional ratemaking procedures, as reflected on the CAS examination syllabus, ignored the “banking” side of insurance operations. In other words, investment income and the time value of money were not explicitly considered in product pricing. But the extraordinarily high investment yields in the late 1970s and the early 1980s caused the economic returns from insurance products to differ radically from the nominal “underwriting” returns. As the authors show, a “traditional” 2.5 percent workers compensation underwriting profit margin in 1982 translated into a 40 percent total return on equity.

Griffin, Jones, and Smith outline three methods of incorporating the time value of money into property-casualty insurance ratemaking: discounted cost, discounted book profits, and internal rate of return. Their paper seems almost prophetic: now, a dozen years later, these three procedures are the three pricing methods discussed in detail in the CAS examination syllabus:

• The Massachusetts discounted cost procedure, or discounted cash flow procedure, was further refined by Stewart Myres and Richard Cohn in 1982, and it has been used for Massachusetts personal automobile and workers’ compensation rate filings since that time. The Myers and Cohn procedure, like the method discussed by Griffin, Jones, and Smith, is based upon the Capital Asset Pricing Model. Variations of this discounted cash flow pricing method, which rely on other assumptions for required rates of return or loss payment discount rates, have since been developed by other actuaries. In 1992, the Myers and Cohn procedure was added to the CAS examination syllabus.

• The internal rate of return procedure, as discussed by Griffin, Jones, and Smith, was being used by the National Council on
Compensation Insurance [NCCI] to justify workers' compensation rate requests in an increasing number of states over the past two decades. Now that the NCCI has switched from advisory rate filings to developing loss costs in most jurisdictions, private compensation carriers are using internal rate of return procedures to evaluate the adequacy of their own rates. The internal rate of return pricing method was added to the CAS syllabus in 1991.

- The discounted book profits pricing method has been a staple of life and health insurance pricing for over thirty years, since it takes into account not just the time value of money but also various market considerations, such as persistency patterns on the book of business and competitive pressures by peer companies. Among casualty lines of business, personal automobile had long been resistant to formal "financial" pricing methods, since auto actuaries are keenly aware of the numerous factors other than investment income that affect auto insurance premium rates. The discounted book profit method has recently been adapted for casualty business, and in 1995, the automobile insurance pricing reading on the CAS examination syllabus was changed from a traditional ratemaking paper that looked only at nominal costs to a discounted book profits pricing procedure.

Griffin, Jones, and Smith conclude their paper with a discussion of several issues that remained unresolved, such as the choice of discount rate, the required return on equity, and the surplus assumptions. After a dozen years, the debate on these issues has intensified, but the resolution is no closer.

Griffin, Jones, and Smith use a new money rate based on corporate bond yields. They correctly note that new money rates should be used instead of portfolio yields, as some insurers were then doing. Most pricing actuaries now advocate using a "risk-adjusted" discount rate, or a rate below the risk-free rate, to account for the uncertainty of loss payments. Similarly, Myers and Cohn use a risk-

adjustment based on the variance of loss payments with stock market returns. The choice of discount rate, whether for policy pricing or for loss reserve valuation, is a major focus of actuarial research (see also the Lowe and Philbrick paper and its introduction in this volume).

Griffin, Jones, and Smith used a required return on equity for insurance companies somewhat higher than the all industry average, based upon a study by Conning and Company of the variability of insurance industry earnings. This issue has since stirred acrimonious debate between insurance companies and "consumer advocates," with the position of state regulators varying among jurisdictions. In some states, rate regulators have required companies to use a low rate of return, often based on past industry averages. In other states, rate regulators have allowed companies to use the expected returns needed to induce investors to provide capital to insurance enterprises.

Public utilities also use "return on equity" procedures to price their services. Public utilities have clearly definable equity needed for their operations: that is, the plants and equipment needed for power generation, telephone service, or fresh water distribution.

Insurance companies do not actually use their equity to produce insurance policies. Rather, their equity "supports" their promises to pay claims brought by their policyholders or pressed against their policyholders. Pricing actuaries must determine the "assumed surplus" needed for a given line of business in order to determine the return on equity. Griffin, Jones, and Smith note the two types of methods that are being used:

• Use leverage ratios, such as premium to surplus ratios or reserves to surplus ratios, based either on industry averages or on statutory requirements.
• Use a "probability of ruin" analysis to determine the surplus needed for a particular line of business to reduce the risk of insolvency to an appropriately low level. This approach has since been refined by Robert Burtis in an "expected policyholder deficit" procedure and by the NAIC in its risk-based capital requirements, though neither of these two extensions has yet been adapted for policy pricing.

When Griffin, Jones, and Smith wrote their IIR paper, none of these topics was on the CAS examination syllabus. Now all three
pricing methods, and each of these "unresolved issues," is covered extensively in the CAS syllabus readings. This paper provides a clear introduction to the still evolving actuarial perspective on these issues, as well as a stepping-stone to the more complex readings currently used for actuarial education.

Profit Measurement in Workers’ Compensation Insurance

Dale C. Griffin
Donald A. Jones
Lee M. Smith

Background

At the October 17, 1968, National Association of Insurance Commissioners’ (NAIC) Executive Committee Meeting the NAIC staff was directed to perform a study on several questions related to automobile insurance. The major part of that study related to profitability measurement, investment income considerations in rate making, and accounting procedures. Among the tentative conclusions were:

1. . . . that existing methods of measuring profitability have led to conflicting results.
2. . . . that return on sales is a helpful guide, but any measuring system must take account the capital invested. . . .

The study pointed out the inadequacies of the 1921 formula (profit load as a percentage of premiums), which is based on premiums and which considers directly only one part of the earnings equation. The study concluded that "in determining how profits shall be calculated for rate making purposes . . . income from all sources should be ascertained and considered." 2

In the late 1970s the insurance profitability debate heated up again. In 1975, the Massachusetts Division of Insurance held rate hearings which culminated in an order that the rate of return be explicitly recognized in rate making. Several other states followed suit, and in 1979 the Casualty Actuarial Society (CAS) sponsored a call for a program on total rate of return due a property and casualty insurance company. 3

A pricing model which has gained considerable attention in recent years, including use in the Massachusetts decision mentioned above, is known as the Capital Asset Pricing Model (CAPM). The model, based on articles by William F. Sharpe, 4 John Lintner, 5 and Jan Mossin, 6 develops a desired yield for a particular investment as a function of the prevailing risk-free rate of return and the expected return of the market portfolio. Under this model, the reward for risk bearing is a function of the covariance between the rate of return on the security in question and that of the market as a whole. The basic formula for expected return on an investment becomes:

\[ E[R_i] = R_f + \beta \cdot \left[ \frac{\text{Cov}(R_i, R_m)}{\sigma^2(R_m)} \right] \]

2. Ibid.
Where \( E[R_i] \) = Expected value of \( R_i \)

\[
R_i = \text{Return on security (investment) being evaluated}
\]

\[
R_f = \text{Risk-free rate of return}
\]

\[
R_m = \text{Return on the market portfolio}
\]

The formula has been used extensively in utility rate regulation and appeared frequently in the articles written for the 1979 CAS call paper program.

Unfortunately, most of the components of the CAPM equation are quite difficult to determine for insurers. Beta coefficients \( (\alpha + \beta) \text{Rm} \), risk-free rates of return, investment rates of return, and market rates of return are not generally accepted or necessarily credible figures for the problem at hand. As a result, use of CAPM in insurance rate-making methodology is still in the formative stages.

In contrast to the CAPM, which develops a target rate of return, this article starts from the point of having an established target rate of return. The primary purpose of the article is to describe and illustrate several methods of measuring the anticipated rate of return in workers' compensation insurance. Methods of profit measurement used by the workers' compensation industry, regulators, and life insurance actuaries are shown to be closely related. Differences between conclusions drawn from use of the various methods are traced to differences in assumptions, rather than differences in methods. This may help clarify some of the real issues that exist. For purposes of this paper, a deterministic viewpoint will be maintained, so that "expected return on equity (ROE)" is replaced by ROE as the profit measure. Application of this model to the stochastic case is a logical extension of the model.

**Return on Equity as the Foundation for Insurance Pricing**

Total return on equity is a measure which has proven to be important in determining the level of profitability necessary to maintain optimal capital investment levels in an industry. When invested capital is not rewarded adequately, it tends to move to more profitable areas. When it is over rewarded, additional capital flows in. When the re-
ward to capital is just right, sufficient capital is available to the in-
dustry to satisfy effective demand for the product.

Determining return on equity in the property and casualty in-

surance industry requires consideration of total income generated
and total capital required. When the ratio is such that the capital
retained is the amount needed to finance desired premium levels,
the system is in equilibrium. As an example, if return on equity in
alternative investments of similar risk were 20 percent, a 20 percent
return on needed equity in the insurance industry would assure
proper levels of capitalization. Return on equity of 15 to 20 percent
has been common in many types of businesses. Return on needed eq-

uity is the standard often used in utility regulation to assure that
the companies utilize the proper degree of leverage. A 1981 study by
Conning and Company based on a comparison of the variation in
return on equity of industrial companies versus property and casu-
alty companies concluded that there is indeed more risk in property
and casualty companies and that a higher rate of return on equity is
needed to make investment in property and casualty companies
comparable to other industries. Some guidelines for expected ROE
were provided that depended upon expected inflation rates.

The starting point for an analysis of the proper profit load in the
insurance rate-making formula is to define total return by its major
components, investment return and underwriting return. Separating
the investment return into components, we have:

\[
\text{Total return} = \text{investment return on surplus} + \text{investment return on reserves} + \text{underwriting gains}
\]

Since workers’ compensation insurance involves payments over
many years for any particular policy year, the impact of the invest-
ment and underwriting gains in future years must be translated into
current values in order to estimate total return on equity. There are
various ways in which this can be done. Current workers’ compen-
sation insurance (WC) ratemaking procedures used by the National
Council on Compensation Insurance (NCCI) are described in a 1975
paper by Roy Kallof. Under those procedures, rates are designed to

7. Conning and Company, Investment Income in Ratesetting (Hartford:
pay for losses and expenses and to provide a margin of 2.5 percent for contingencies and underwriting profit. Thus, investment income is only implicitly considered, and this approach is referred to in this paper as an "implicit profit measure." However, as interest rates earned by insurers have risen over the past few years, the need to include an explicit consideration of interest earnings in premium determination has become an increasingly important issue. A defense of the exclusion of investment income from rate making in WC is made by Frank Hawwayne, of the NCCL, in his 1979 paper. The same logic and approach used by the Hawwayne paper have been used in information submitted to the Michigan Insurance Bureau in conjunction with the 1981 Workers' Compensation Rate Revision-Michigan, filed by the Workers' Compensation Rating and Inspection Association of Michigan. The following section of this paper demonstrates alternative ways of measuring total return on equity in an insurance situation.

Alternative Measures of Return on Equity

Discounted Cost (DC)

Current methods of profit measurement in WC essentially measure the excess of premiums over expected future losses and expenses discounted at 0.0 percent interest. An obvious generalization of this approach is to discount future expected losses and expenses at a rate of interest expected to be earned on assets held from premiums to meet these losses and expenses. An "after-tax" rate of return '1' during the 1st year since issue is appropriate in this case. The current methods would measure the profit margin '2M' resulting from a premium '1P' as:

\[ M^{CM} = P - \sum_{t=1}^{n} (E_t + C_t) \]  

where \( t \) = time after issue  
\( n \) = policy year of last benefit payment  
\( E_t \) = expenses and taxes, time \( t \)  
\( C_t \) = claims, including loss adjustment expense, time \( t \)

The discounted cost (DC) method would measure the profit \( M^{DC} \) as:

\[ M^{DC} = P - \sum_{t=1}^{n} \left( \frac{1}{1+i} \right)^t (E_t + C_t) \]  

where \( i = 0 \)

The method of measuring the impact of investment income suggested by Mr. Harwayne takes a different form. It discounts expected interest income on future reserves. However, the two methods are equivalent and will give the same results if the same cash flows and interest rates are used. A demonstration of this equivalence is included in the Appendix. Therefore, any differences in the results of the two methods are due to differences in the assumed cash flows.

With the Discounted Cost measure, profit as a percentage of premium is \( \frac{M^{DC}}{P} \), which can be translated to return on equity by assuming there is some fixed ratio of equity 'E' to premium. If the ratio of premium to equity is \( r \), then return on equity by the DC method can be measured as:

\[ R^{DC} = r \cdot \frac{M^{DC}}{P} + i \]

A similar type of translation from return on premium to return on equity is shown in the paper by Karlinski in the Casualty Actuarial Society 1980 Discussion Paper Program.\(^{11}\)

The advantages of the DC measure of profitability over an implicit profit measure are that it reflects interest rate expectations and that an estimate of ROE can be obtained for comparison of alternatives. It is also a fairly simple method to use. Disadvantages are that the actual pattern of annual statement gains is not recognized, and that the levels of reserves and surplus held are not reflected in cash flow estimates. However, it is an improvement over implicit methods.

Discounted Book Profits (DBP)

A method that can overcome one of the problems in the DC method is known as "Anderson's Method" among life insurance actuaries. This method consists of calculating a "book profit" for each year after issue and using discounted book profits as a measure of profitability. In this way, the pattern of income in annual statement terms is recognized.

In the WC situation, book profits discounted to time of issue would be calculated as:

\[ BP_t = V_t - P_t - E_t - C_t - \frac{V_{t+1}}{1 + i} \]

where \( V_t \) = reserves held at time \( t \).

The expression \( \frac{V_{t+1}}{1 + i} \) can be interpreted as the (discounted) change in reserves over time \( t \) to \( t + 1 \), valued at time \( t \). The reserve at time \( t + 1 \) is discounted at \( i \) to estimate the amount of funds needed at time \( t \) to accumulate to \( V_{t+1} \) in one year. This is the manner in which interest earnings are reflected. The implicit assumption is that funds in excess of those required to provide reserves are returned to the investor as a "book profit."

Under Anderson's method in life insurance the amount of "investment," or equity, is taken to be the initial loss that must be paid from surplus. However, in the WC case there is not necessarily an initial loss; so, as with the DC method, we might reasonably compare gains to investment measured in a different way. As a first step, total gains (margin) can be measured:

\[ M^{\text{MOP}} = \sum_{n=1}^{\infty} \frac{1}{(1+i_n)^n} BP_i \]  

where \( i_n \) = rate of return required by investors on surplus invested in new business (and \( i_n = 0 \)).

As with the DC method, the return on premium can be translated to return on equity:

\[ R^{\text{MOP}} = r \cdot \frac{M^{\text{MOP}}}{P} + i_t \]  

The DBP method has the advantage of showing the projected year-by-year effect on the annual statement of a particular block of business. It does not use cash flow directly in measuring profitability, so results in general can be different from a cash flow based method such as DC.

**Internal Rate of Return (IRR)**

Workers' compensation insurance requires a certain investment, even for an existing company, in order to maintain surplus at an adequate level relative to premiums and reserves. The return on that initial investment can be expressed as an internal rate of return if all the relevant cash inflows (investments) and outflows (returns) are considered. The IRR method as applied to WC assumes that the insurer will hold a constant percentage of reserves \( f' \) as surplus; \( f' \) is calculated so that the premium to surplus ratio of \( f' \) is obtained for the block of business over its entire duration, or for a growing premium volume. The excess of funds over the reserves plus required surplus is released as a cash flow to the investor. For comparison with the DC and DBP methods, a one-year investment can also be assumed. Algebraically, a fund \( F_t \) at the end of the year \( t \) is accumulated, after returning cash flows of \( CF_t \), to investors:

\[ CF_t = [F_{t-1} + P_t - E_t - C_t] [1 + i_t] - F_{t-1} \quad t = 1, ..., n \]

where \( F_0 = CF_0 = 0 = P_t \) for \( t = I \)

and \( F_t = [1 + f']V_t \) for \( t = 1, ..., n \)

To determine the internal rate of return \( R^{\text{IRR}} \), an iterative method is used to find the interest rate \( R^{\text{IRR}} \) such that the investment of \( f' \cdot V_t \) is equal to the present value of cash flows:
\[ f \cdot V_t = \sum_{t=1}^{\infty} \frac{1}{1 + R^{Rt}} \cdot CF_t \] 

The advantage of the method is that it reflects the actual investment and return pattern in insurance of this kind on a cash flow basis [to the investor] and calculates a return on equity that can be directly compared against returns on competing uses of equity. It reflects the level of interest rates as well as the level of reserves that the insurer needs to hold.

**What Investment (Equity) Is Required?**

The methods of profit measurement described above all assume that a particular ratio of premiums to equity \( f \), the leverage, is specified, thus establishing the amount of surplus that must be maintained (invested) to allow a given level of premiums to be written. However, the determination of \( f \) is not without controversy. One guideline is the maximum ratio of premium to equity viewed as acceptable by insurance regulators. This is generally held to be 3:1 for a property and casualty insurer as a whole. Certain lines of business are considered to involve more or less risk than others, so, they would justify a lower or higher ratio of premium to equity. Another perspective on the surplus required is obtained by examining actual past ratios of premium to equity for property and casualty insurers. A report by Conning and Company shows this ratio to have been an average of 1.52 during the period from 1951 to 1980 and 2.14 from 1976 to 1980. Still another perspective is given by Frank Harwayne in his 1979 paper, an even more conservative 1:1 ratio of premium to equity is prudent for workers' compensation insurance. A theoretical answer to the question of required equity might be found by choosing an appropriate acceptable probability of ruin or probability that the surplus of the WC line of business will eventually become negative and establishing the appropriate target level of surplus accordingly. Further research is needed into such an approach. For purposes of this paper, we have shown results for a variety of required equity levels in relation to premiums.

---

What Is the Proper Basis for Investment Income Forecasts?

The WC product corresponds to cash flow pattern to a short duration single premium immediate annuity product in life assurance in that premiums are received first and benefits are paid later (for the most part). The premium is available to the insurer in the very near future. (In the current Michigan WC situation, rates filed on October 31, 1981, will determine premium payments for 1982.) Such amounts, therefore, will be invested at near future rates of interest. and to the extent that maturities and repayments will generate funds to pay future benefits, there will be no need to reinvest at later, probably different, rates of interest. Perfect matching of the duration of assets and liabilities (meaning the average time to receipt or payment of funds weighted by their present values) is called "immunization" of a portfolio, and it guarantees that future changes in interest rates will not affect the relative values of assets and liabilities. While a portfolio of investments backing a block of WC insurance cannot be perfectly immunized in practice, the important point is that cash flows generated by the WC premiums can be invested at near future interest rates and the timing of the product is favorable to create a nearly immunized fund, looking in current high yields. An example of the practical considerations in an immunization attempt is given by Smith, Berney, Harris, Upham, and Co., Inc., in a recent report on immunizing a municipal bond portfolio. It is also common practice among life insurers to price single premium life annuities using currently available interest rates. Group pension product operations are largely based upon "investment year" interest rates. Therefore, it seems reasonable to use expected available "new money" yields for the period over which WC premiums will apply as a basis for pricing the product.

In contrast to this approach, WC industry estimates of investment income from the product are based on a five-year average of portfolio rates of return on assets. In the present situation of current yields far in excess of portfolio yields, and portfolio yields rising steadily, the five-year historical average of portfolio yields is extremely out of date. As an example of the difference, the 1979 Hargrave paper uses the 1972-1976 average before taxes and expenses of 5.61 percent when Moody's Aaa bonds were yielding approxi-
nately 8.5 percent at the end of 1977. Currently, the 1976–1980 portfolio average (property and casualty insurers, pretax, preexpense) is 6.73 percent, while Moody's average Aaa rates have been at least 12.8 percent from January to August of 1981. Even a five-year average of Moody's Aaa bond yields produces a 9.35 percent rate, which after the estimated 15 percent tax rate used by Harwayne yields a 7.95 percent after-tax return, before expenses. Actual projections of 1982 yields would be much higher. While the five-year average of portfolio rates is currently lower than prevailing rates, the opposite condition could obviously exist, and the five-year average could overstate expected returns.

An offset to the high available yields might be in order to reflect uninvested funds. In our models, this can be accomplished through use of a slightly lower interest rate than would otherwise be used, depending on the percentage of uninvested assets assumed.

Workers' Compensation Model Assumptions

The three alternative measures of ROE described above are applied to an estimate of WC costs based on data from the 1981 Michigan WC filing by the Workers' Compensation Rating & Inspection Association of Michigan. Estimates of ROE at filed rates are produced by each method. Next, the level of premiums required to generate a 15 percent ROE or a 20 percent ROE are obtained separately by each method and for various amounts of leverage. The assumptions used in the example are described below.

Cash Flow

For each $100 of premium (filed basis), claims (C.) of $80 are expected, in the pattern shown in Table 1.

These cash flows differ significantly from the Harwayne example. One reason is that the Harwayne figures are based on estimates.

---

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<tr>
<th>Policy Year</th>
<th>Claims Paid</th>
</tr>
</thead>
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<tr>
<td>1</td>
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<tr>
<td>2</td>
<td>13.00</td>
</tr>
<tr>
<td>3</td>
<td>10.10</td>
</tr>
<tr>
<td>4</td>
<td>6.60</td>
</tr>
<tr>
<td>5</td>
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<tr>
<td>12</td>
<td>2.30</td>
</tr>
<tr>
<td>13</td>
<td>2.20</td>
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<tr>
<td>14</td>
<td>2.20</td>
</tr>
<tr>
<td>TOTAL</td>
<td>$80.00</td>
</tr>
</tbody>
</table>

Claims are assumed to occur at the beginning of each year. The 80 percent figure is the loss ratio to net premiums, including loss adjustment expense, reported in the 1981 filing. The distribution by year is determined from Form 78165 of Development Factors for Total Paid Losses.

of average duration of payment for the various injury types. Apparently those estimates are not accurate representations of cash flows for Michigan historical experience. The pattern shown here is somewhat longer and thus develops more investment income. Another difference is that the Harwayne figures are based on standard earned premium rather than net premium. Net premium is used here because it is consistent with the various measures of leverage, which are comparisons of net premiums to equity. The leverage figures used by Harwayne are therefore slightly understated. Further, the loss adjustment expenses, excluded from cash flow projections by Harwayne, are included with losses here. This approach appears reasonable based on a description of loss expense patterns by David Skurnick. This also results in higher estimated reserves and investment income per dollar of premium. Finally, the timing within years is different. We have assumed that both premiums and benefits

are paid at the beginning of each year, an assumption that probably understates investment income but which simplifies calculations and estimates of timing.

Expense

Expenses \( E_1 \) of 17.50 are paid, all at the beginning of the first year. This, together with expected losses, implies a loading of 2.5 percent of premium for profit and contingencies. For simplicity, the model does not reduce expenses if premiums are reduced, although it would be more accurate to reflect reductions in expenses that are truly a function of premium.

Federal Income Tax

Federal income tax (FIT) is payable at the end of the first year, 46 percent of underwriting gain, if positive. No credit for negative tax was assumed. The balance of FIT is recognized through use of an after-tax rate of return on assets.

Investment Income

Except where indicated otherwise, interest is earned on invested funds at a rate of 5 percent after taxes. This rate is based on current taxable and nontaxable yields available to life insurers and is projected to continue for the duration of the benefit period because the premium will all be invested at that rate in the first year. (There is no necessity for investing funds in the future from a single year of business.)

Reserves

Reserves \( V_t \) are equal to the sum of undiscounted future losses held each year.

Investment and Leverage

The initial investment is taken to be X percent of premium in the DC and LBP methods, with the investment required for one year. In the IRR method, the X percent of premium figure not only is used
for comparison but also is converted to an equivalent amount in terms of reserves. In this method, an investment of X/R percent of the first year reserve is initially required and surplus of X/R percent of reserves is maintained thereafter. The figure R is the ratio of total loss reserves held (in dollars-years) to premiums generating those loss reserves, according to the assumed payout pattern. In calculating R, later duration reserve factors are discounted at 20 percent per year to provide for the desired level of surplus when premium volume is growing each year.

Results

Discounted Cost Results

\[ M^{\text{DC}} = P - E_0 - (1.08)^{-1} \sum_{t=1}^{\infty} (1.08)^{-1} C_t \]

\[ = 100 - 17.5 - 1.06 - 64.18 \]

\[ = 17.26 \]

The ROE, given a leverage factor \( f \), is shown in Table 2.

For a given ROE requirement and leverage \( f \), the new premium \( P' \) must exceed discounted costs of 81.68 (loss and expense) so that the following is true: \( f \cdot \frac{P - 81.68}{P'} + .08 = \text{ROE} \)

<table>
<thead>
<tr>
<th>Leverage ( b )</th>
<th>ROE ( f )</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>77.0%</td>
</tr>
<tr>
<td>3.0</td>
<td>59.8</td>
</tr>
<tr>
<td>2.0</td>
<td>42.5</td>
</tr>
<tr>
<td>1.0</td>
<td>25.3</td>
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</table>
TABLE 3
Premium Required (As % of Filed)
[Discounted Cost Method]

<table>
<thead>
<tr>
<th>Leverage</th>
<th>15 PERCENT ROE</th>
<th>20 PERCENT ROE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>83.1%</td>
<td>84.2%</td>
</tr>
<tr>
<td>3.0</td>
<td>83.6</td>
<td>85.1</td>
</tr>
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<td>2.0</td>
<td>84.6</td>
<td>86.9</td>
</tr>
<tr>
<td>1.0</td>
<td>87.8</td>
<td>92.8</td>
</tr>
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</table>

So \( P' = \frac{f \cdot [81.68]}{1 + .08 \cdot \text{ROE}} \) — and the results are shown in Table 3.

Discounted Book Profits

Table 4 shows the results of the model using the filed premium of $100 and a reduced premium of $86.50. Using a 15 percent discount rate, the $100 premium generates an ROE of 53.1 percent.

\[
R_{\text{w}1} = 3 \cdot \frac{15.028}{100} + .08 = 53.1\% \text{ ROE}
\]

The $86.50 premium generates an ROE of 15.1 percent.

\[
R_{\text{w}1} = 3 \cdot \frac{2.593}{86.5} + .08 = 15.1\% \text{ ROE}
\]

The $6.76 is the first year negative book profit, which must be reflected since this portion of the amount invested was needed to fund the deficit and was not earning the 8 percent return. A similar calculation shows that a premium of $89.00 will generate an ROE of approximately 20 percent.

Table 5 gives premiums (as a percentage of filed premium) necessary to produce a 15 percent or 20 percent ROE at various levels of leverage using the present value of book profits method.
<table>
<thead>
<tr>
<th>Year</th>
<th>Premium</th>
<th>Expenses</th>
<th>Loss</th>
<th>Gain</th>
<th>Reserves</th>
<th>Underwriting Income</th>
<th>Paid Claims</th>
<th>Undue Income</th>
<th>Total Income</th>
<th>Book Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>100.00</td>
<td>17.50</td>
<td>22.70</td>
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</tbody>
</table>
### Table 4
Book Profits Model Using Interest Rate of 8 Percent and $86.50 Premium

<table>
<thead>
<tr>
<th>Year</th>
<th>Premium</th>
<th>Expenses</th>
<th>Loss</th>
<th>Reserves</th>
<th>Underwriting Gain</th>
<th>Federal Income Tax</th>
<th>Book Profit</th>
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</thead>
<tbody>
<tr>
<td>1.00</td>
<td>86.50</td>
<td>17.50</td>
<td>22.70</td>
<td>57.30</td>
<td>-11.00</td>
<td>0.00</td>
<td>-6.76</td>
</tr>
<tr>
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Present Value of Book Profits
At 8 Percent 17.25497997
At 15 Percent 15.02821485
At 20 Percent 13.87532448
TABLE 5
Premium Required (As % of Filed)
Present Value of Book Profits Method

<table>
<thead>
<tr>
<th>Leverage</th>
<th>15 PERCENT ROE</th>
<th>20 PERCENT ROE</th>
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<tr>
<td>4.0</td>
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<td>1.0</td>
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<td>96.4</td>
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</table>

Internal Rate of Return

Table 6 shows the results of the internal rate of return model with this example using $100 and $89.70 premiums. It can be seen in Table 6 that with a $100 premium the discounted cash flow nearly equals the original investment even at a 50 percent discount rate. They are approximately equal when the discount rate is 41.6 percent, so, it is the internal rate of return, or ROE by this measure. The 89.70 premium generates approximately equal investment and discounted cash flows at 20 percent, so, it is the premium required to earn a 20 percent ROE by this measure. Similarly, a premium of $86.80 is required to generate a 15 percent ROE by this measure.

Table 7 gives premiums (as a percentage of filed premium) necessary to produce a 15 percent or 20 percent ROE at various levels of leverage using the internal rate of return method.

Summary of Results

Several quantities have been compared based on the three methods, including XOE at filed premium rates and premium levels necessary to generate expected ROE of 15 percent or 20 percent. While the results of each method are different, they are similar since the methods are closely related. In fact, under certain conditions all three methods give identical results. Specifically, if the discount rate is taken to be equal to the interest rate earned on assets, then the DC
and DBP methods give identical results. Furthermore, if the IRR method reflects a one-year investment (after the first year only reserves are held), as in the DC and DBP cases, then all three methods produce the same discounted margin. The measure $1 - \text{margin} + 1$ is therefore the same by all three methods, although the internal rate of return would not, in general, be the same as this measure. The two measures will only be equal if the discount rate that is used is equal to the IRR and if the margin is evaluated as of the end of the first year.

For additional perspective on how the alternative measures compare at various interest rates, the following table shows expected ROE at various interest rates. (A constant 7 percent difference was assumed between the interest rate earned on assets and the discount rate used to discount book profits in the book profits measure.)

The 2.5 percent loading standard has been used for many years in pricing WC insurance; however, it can be seen from the above chart that rising interest rates significantly increase the expected ROE generated by 2.5 percent of premium loading.

Conclusions

By each of these measures, the combination of an 8 percent assumed after-tax interest rate and a leverage factor of three produces an ROE in excess of 40 percent, which is high by current business standards. If the assumptions in the model represent future experience accurately, the results imply that premium rates could be cut by substantial amounts from those filed. The IRR measure with 20 percent growth is the most conservative of the measures and suggests that a reduction of 10.3 percent from filed rates is justified, based on the new profit standard of a 20 percent ROE and a reduction of 13.2 percent is justified for a 15 percent ROE. The discounted book profits method gives similar results. Either of these methods would seem preferable to current methods, which do not measure ROE and ignore the impact of investment income. Once a trial premium is established, such as a “no profit load” premium, the required premium can be calculated and a revised profit margin can be obtained.
<table>
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<th>Year</th>
<th>Premium</th>
<th>Expenses</th>
<th>Federal Income Tax</th>
<th>Loss</th>
<th>Beginning Balance</th>
<th>Investment Income</th>
<th>Ending Balance</th>
<th>Reserves</th>
<th>Required Surplus</th>
<th>Cash Flow</th>
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<td>17.50</td>
<td>1.15</td>
<td>22.70</td>
<td>73.45</td>
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On Investment of 13.64757852 at $ of 0.2581776356
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30.90254949 at 8 Percent
24.61689622 at 15 Percent
21.48727936 at 20 Percent
11.92647985 at 50 Percent
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</table>

On Investment of 12,341,877,83 at F of 0.2136453391

Return is:
20.26166871 at 8 Percent
14.06199819 at 15 Percent
12.2038155 at 20 Percent
4.815936516 at 50 Percent
TABLE 7
Premium Required [As % of Filed]
Internal Rate of Return Method [20% growth]

<table>
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<th>Leverage</th>
<th>15 PERCENT ROE</th>
<th>20 PERCENT ROE</th>
</tr>
</thead>
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<td>86.1%</td>
<td>88.5%</td>
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<tr>
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<td>86.8</td>
<td>89.7</td>
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TABLE 6
Roe by Various Measures

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<th>Discounted Book Profit</th>
<th>1 Year Investment</th>
<th>20 Percent Growth</th>
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<tr>
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<td>53.1</td>
<td>43.2</td>
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Future Studies

A profit measure has many determinants, some of which have been described previously, and many implications if actually applied. Both the determinants and implications of the alternative measures suggested could be studied further. Some of the directions for study include:

1. Evaluation of the impact of profit measures on other lines of business with different cash flow patterns (a slower closing line such as medical malpractice insurance would obviously increase the impact of investment income on the profit margin).
2. Evaluation of the effect of adoption of such profit measures on year-by-year return on equity of the particular line or a company as a whole,
3. Determination of necessary surplus levels relative to reserves or premiums to limit probability of failure and determination of necessary expected rates of return on equity to attract capital to the property and casualty industry (stochastic, rather than deterministic analysis), and

4. Evaluation of the impact of these profit measures from an insurance accounting point of view, including consideration of General Accepted Accounting Procedures versus statutory accounting and the allocation of income by line and by state.

Appendix

Demonstration that the present value of interest earnings on reserves is equal to excess of losses over discounted losses (Harwayne's method versus discounted cost method)

Assume losses [past] of C_t at time t.

Then under the discounted cost method

\[ \text{PV [losses } C_t, t = 0, ..., n] = \sum_{t=0}^{n} \left( 1 + i \right)^{-t} C_t \]

and losses - PV [losses] = margin =

\[ \sum_{t=1}^{n} C_t - \sum_{t=0}^{n} \left( 1 + i \right)^{-t} C_t \]

\[ \sum_{t=1}^{n} C_t - \sum_{t=1}^{n} \left( 1 + i \right)^{-t} C_t \]

Under Harwayne approach, you look at the present value of interest earnings on reserves, where no distinction is made between loss reserves and unearned premium reserves because a calendar policy year is assumed.

\[ I_t = \text{interest earned between } t \text{ and } t + 1 \]

\[ I_t = i \cdot \sum_{t+1}^{t} C_t \]
margin is \( \sum_{t=1}^{n} \frac{C_t}{(1+i)^t} \) = \( \sum_{t=1}^{n} \frac{C_t}{(1+i)^t} \) - \( \sum_{t=1}^{n} \frac{C_t}{(1+i)^t} \) 
\[ \begin{align*}
= i \cdot \sum_{t=1}^{n} \frac{C_t}{(1+i)^t} \\
= i \cdot \sum_{t=1}^{n} \frac{C_t}{(1+i)^t} \\
= i \cdot \sum_{t=1}^{n} \frac{C_t}{(1+i)^t} \\
= \frac{i}{1+i} \left[ C_1 + C_2 + \ldots + C_n \right] \\
+ \frac{i}{1+i} \left[ C_{n+1} + \ldots + C_n \right] \\
+ \frac{i}{1+i} \left[ C_{n+2} + \ldots + C_n \right] \\
+ \ldots \\
= \sum_{t=1}^{n} C_t \cdot \frac{i}{1+i} \\
\text{but since } a_{1+i} = \frac{1}{1+i} - (1+i)^{-1}, \text{ then } a_{1+i} = 1 - (1+i)^{-1} \\
= \sum_{t=1}^{n} C_t \cdot \left( 1 - (1+i)^{-1} \right) \\
= \sum_{t=1}^{n} C_t \cdot \left( 1 - (1+i)^{-1} \right) \\
\text{as under the discounted cost method.} \\
\text{Suppose payments, reserves, and interest earned are:} \\
\begin{array}{ccc}
t & C_t & \sum_{t=1}^{n} C_t(i) \\
0 & 20 & 80 \\
1 & 20 & 60 \\
2 & 20 & 40 \\
3 & 20 & 20 \\
4 & 20 & 10 \\
\end{array} \\
i \text{ (at 7%) } \\
0 & 20 & 80 \quad 5.60 \\
1 & 20 & 60 \quad 4.20 \\
2 & 20 & 40 \quad 2.80 \\
3 & 20 & 20 \quad 1.40 \\
4 & 20 & 10 \quad \ldots \\
\text{The margin using discounted costs is:}
At i = 7%, \( \sum_{i=1}^{n} C_i - \sum_{i=1}^{n} (1+i)^{-i} \cdot C_i = 100 - 20 \cdot 0.07 \)
\[= 100 - 87.744225 \]
\[= 12.255775 \]

Harwayne PV(int) = 5.60[1.07]^4 - 1 + 4.20[1.07]^3 - 2 + 2.80[1.07]^2 - 3
+ 1.40[1.07]^1 - 4 = 12.255775
Implications of ISO’s Change to Loss Cost Filing for Rate Regulation

Gregory Krohm

Abstract

In this analysis of the decision by ISO that it would no longer prepare and file rates for its members, a regulator examines the implications of the change to loss cost filing. Relying on economic analysis and results of a survey of rate deviations in Wisconsin, he concludes that for most states, that is, those following the NAIC Model Competitive Rating Act, there will be little change. For insurers with a small market share in a particular state, he forecasts a slight increase in cost of operations because of the need to rely on outside assistance to transform prospective losses into rates and to rely on outside assistance to transform prospective losses into rates and to prepare final rate manuals. But, the additional review will improve stability and adequacy of rate setting.

† The views expressed in this article do not necessarily represent those of the Wisconsin Office of the Commissioner of Insurance.

The author would like to thank Stanley DaRose, Paul Merello, Kevin O’Connor, Michael O’Donohue, Roger Strochacz, and James Surfas, for their useful comments on earlier drafts. Any errors that may remain are the sole responsibility of the author.

* Ph.D. (Economics), Virginia Tech, B.A. (Economics), Loyola University—Chicago. Dr. Krohm is the Administrator for Regulation and Enforcement, Wisconsin Office of the Commissioner of Insurance.
Introduction

In what to some appeared to be a sharp break with tradition, the Insurance Services Office, Inc. (or "ISO") announced on April 3, 1989, that it would no longer be in the business of preparing and filing rates for its members. Instead of filing final rates on behalf of its members, ISO would only file the loss component of rates (termed "prospective loss costs") and leave it to member companies to add loadings for their individual operating and underwriting expenses and profits. ISO thus ended its service which critics of the industry had come to view with increasing suspicion.

This paper addresses three consequences of that decision in the context of the Wisconsin property and casualty industry: changes to the structure and competitiveness of the industry; the operating procedures and costs of insurers; and, the regulatory responsibility of the Insurance Commissioner. Although the context is Wisconsin experience, that experience should tend to be comparable to many of the 26 or so states that rely heavily on competition to govern rates, i.e., employ variants of "use and file," "file and use," or "no file" regulation.1

What is ISO?

Before launching into a discussion of the consequences of loss cost filing, it is helpful to review ISO's purpose and functions. ISO is a not-for-profit corporation licensed by nearly every regulatory body in the nation as a "rate advisory organization." (known also as "rate service organization," and "rate bureau"). ISO also performs the much narrower function of a licensed "statistical agent," dealing only with the collection and dissemination of loss information of members.

There are many other bureaus licensed by state regulators to collect loss statistics and develop rates, e.g., Mill and Elevator Association, Registered Mail Insurance Association, The Surety Association of America, and The National Council on Compensation Ins.

surance. Depending on state law, a bureau may perform a variety of other functions. ISO is the largest of these rate advisory organizations in terms of members, premium coverage, and lines of insurance. While the current public and regulatory interest in ISO focuses on rate-setting, ISO also performs other important functions:

- With the help of company and agent advisory committees, ISO develops rating rules and policy language for insurance policy forms. This standardized policy language helps promote homogeneity and consistency in loss data collected by ISO;
- It develops, prints, and distributes manuals containing rates, rating rules, and forms used by insurers and their agents to write coverages;
- Through its subsidiary, Commercial Risk Services, ISO conducts surveys of commercial buildings to rate them for their fire hazards;
- Through ISOTEL, it offers a data communication network dealing with rates and forms to its members, and;
- Through its subsidiary ISO Data Inc., it generates special studies on topics of interest to member companies and public policy makers.

As a "rate advisory organization," ISO collects, edits, and analyzes loss and premium data for 14 lines of insurance; e.g., homeowners, commercial property, and inland marine. It is with that activity that this paper deals. A generally accepted principle of insurance law is that an insurance rate should reflect the expected future losses for a given class of insureds. The larger the sample of loss experience analyzed, the more statistically accurate the estimate of future loss experience will be. The advantages of a larger sample of loss experience are especially beneficial to companies with little or no experience in a particular line of insurance. Major insurers, such as State Farm Mutual or Allstate Insurance, can, for the most part, rely comfortably on their own loss

experience in setting rates in personal lines. However, even industry giants may have insufficient experience in certain lines of insurance to be statistically credible, and, therefore, benefit from the accuracy of a common database.

At its inception in 1971, ISO replaced many state level ratemaking organizations which enforced rigid compliance with their proposed rates. Each rate advisory organization was highly specialized, only collecting data on narrow lines of insurance and for a limited geographical area. Prior to the landmark Southeastern Underwriters decision of 1944, each bureau had the power to set the terms of the contract and force members to adhere not only to its rates but to its policy forms and underwriting rules. Regulatory laws essentially supported this cartel arrangement on the theory that reckless competition was irresponsible for destabilizing rate wars.

A central difference between ISO and its predecessor bureaus was the policy of nonadherence, meaning that ISO members are free to use or deviate from rates, rates and forms filed by ISO with regulators. As shown below, member companies today do deviate, often substantially, from ISO filed rates, rates, and advisory policy forms.

The Turning Point

ISO's change to prospective basis cost advisory filings was initiated voluntarily by its own governing board. The move brought mixed reactions from critics and member insurers. One point of view was that ISO had "caved in" to unjustified criticism of its ratemaking responsibilities. Others viewed it as an astute move to fend off further criticism and regulatory restrictions on the industry. A third position was that the change was the inevitable extension of past ISO actions to move away from final rate filings.

Observations also differed markedly on the impact of the change on member companies, with assessments ranging from colossal to negligible. Below are some of the events which directly or indirectly led to the turn in ISO policy.

At its December, 1988, meeting, the National Association of Insurance Commissioners ("NAIC") began to take official notice of the growing interest in the role of rate service, or advisory, organizations. A working group was appointed to study the proper role of advisory organizations in preparing and filing rates.

After holding a series of hearings, the working group concluded that, in general, rate service organizations should be prohibited from preparing and distributing final rates for subscribing companies. The working group recognized the statistical and administrative advantages of having a central agent collect and analyze loss data. However, for competitive reasons the working group felt that companies should be forced to develop their own expense and profit loading factors.6

The second event influencing the course of ISO activity was the suit brought by 19 states against ISO and a group of insurance companies, reinsurers, and brokers. That suit charged the defendants with violations of federal and state antitrust laws, stemming from alleged conspiracies, boycotts and other conduct designed to restrict the availability of certain commercial insurance coverages.6

The suit did not bear directly on the ratemaking process. However, the Attorneys General complaint petitioned for specific relief which included 1) ISO's renunciation of final ratemaking activities and 2) making ISO statistical information available to any member of the public.

While probably not tied directly to the ISO policy shift, there has been increasing legislative interest at the Federal and state levels in what was perceived as anticompetitive rate practices. Proposition 103 in California, which struck down the rate service activities of ISO, is a recent manifestation of this activity. The recurrent debate over repeal of the McCarran-Ferguson Act is another. McCarran-Ferguson is seen as immunizing a

6. In re Insurance Antitrust Litigation, 723 F. Supp. 464 (N.D. Cal. 1990) this suit was summarily dismissed by the original trial judge and is now on appeal to the 9th Circuit Court of Appeals.
 monopolistic pricing system that would not be tolerated in any other segment of the financial services industry.

- Editors and industry spokesmen are now often heard to echo the following sentiment, "If McCarran-Ferguson . . . is responsible for the industry's image as an uncompetitive and insulated monolith [as Mr. Nader contends], it may be time to dump the 45-year-old act and replace it with narrower regulations providing for common forms, sharing of loss data, and state regulation." 7

Taken together, these events seemed to indicate skepticism or downright hostility toward the practice of bureau filed final rates. The statistical arguments for a credible database has enough merit to defend the practice of collecting data and filing collective reports on losses.

Substance Vs. Symbolism

One agent's publication said of the ISO change that it "... yanked the quiet underpinning beneath the American Agency System and much of the U.S. insurance business. ISO's decision bristled with ramifications." 8

Although that sentiment was typical of early reactions, the ISO change to loss cost filings may pass as a non-event in most states and for most companies. Using Wisconsin as an example, this section will analyze the significance of the change to the structure of the industry, to market conduct, and to regulatory operations.

Economists who study industrial organization have developed an analytical framework to which this paper will conform. 9 The elements of this model are

- Performance goals—the fundamental assumptions about what society wants from producers of goods and services;

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9. Among the many authors to use this paradigm are J. S. Bain, INDUSTRIAL ORGANIZATION (1959) and F. M. Scherer, INDUSTRIAL MARKET STRUCTURE AND ECONOMIC PERFORMANCE (1970).
• Market conduct— the behavior of buyers and sellers in a market with respect to pricing policies and practices, cooperation among firms, research and development, advertising, and legal tactics.

• Market structure— the number and type of competitors in the market and constraints on their access to production inputs and technology.

Economics strives to explain and predict performance through the interaction of conduct and structure. Market structure, by setting up constraints and opportunities for certain types of behavior, influences market conduct. Conduct, in turn, determines how resources will be allocated and price signals set.

Following is a discussion of current pricing behavior and the way in which it might be altered directly by the change in ISO policy or indirectly through a change in industry structure.

Industry Structure

This section reviews the structure of the P&C industry and how loss cost reporting might influence the number, size or other characteristics of the industry. The structure of any industry refers to such things as the number and size distribution of sellers and buyers in a given market, the degree of physical and subjective product distinctions, the presence or absence of barriers to entry, costs of production, and the geographical spread of buyers and sellers. All of these situations are derived from the technology of production, access to resources, and the nature of consumers in the market.10

A recurrent theme in the battle over the preservation of rate advisory bureaus deals with the survival of small and medium firms. Without access to proper loss information, pricing becomes less precise, exposes the company to more variability in rates and loss experience, and thereby reduces the likelihood of survival for small and medium size firms. Likewise, larger firms contemplating entering a new market would be impeded by the risk of not having the best available information on expected losses. Thus, the argument goes

10. Scherer, op. cit. at 4.
that having a statistical agent collect and analyze loss cost informa-

tion promotes competition by increasing the number of insurers

willing or able to write in a given line or area.

This pro-competitive argument seems plausible on the basis of

economic theory. However, it lacks empirical confirmation. Insurers

do not appear to be rigidly constrained in their marketing strategy

by the presence or absence of a high quality database on losses. Ex-

amination of rate justifications in Wisconsin suggests that small in-

surers worry less about loss experience than about competitive pres-

sures. The smallest companies seldom justify their rate filings on

the basis of experience, citing instead "judgment" or "competitive

factors." Smaller companies can be better characterized as "price

followers" who must follow the rate trends of recognized market

leaders for a particular line.

Because ISO will no longer file final rates and produce manuals

containing final rates for commercial lines, some companies that are

licensed in Wisconsin but write negligible amounts of commercial

business may elect to drop these lines entirely rather than incur the

additional cost of filing expense multipliers for their Wisconsin busi-

ness. The withdrawal of companies with little premium should have

a negligible impact on any of the lines they may be licensed to write

in, particularly since these firms could easily re-enter the market if

they were seized with ambition to expand to a more workable mar-

ket share. The switch to prospective loss cost filings will not in any

way alter the accessibility of companies to information, and hence

should not present a barrier to competition. Loss information, for

which an argument can be made for the need to pool large samples

of company experience, will still be available from ISO. To the extent

that insurers feel the need to compare their administrative or mar-

keting costs with those of their competitors, expense information is

already freely available from information filed with regulators (or

company annual statements and insurance expense exhibits) and

data compiled in the trade press [e.g., A.M. Best].

Rate regulation laws in Wisconsin and many other states require

regulators to monitor the competitive conditions of insurance mar-

kets and, where competition is demonstrated to exist, rely on it to

ensure that rates are not excessive or unfairly discriminatory.11 As

measured by the usual standards employed by economists, the prop-
erty and casualty industry in Wisconsin appears to be relatively com-
petitive. The move to prospective loss cost filing should not alter
noticeably the structure of the industry, e.g., by removing significant
underwriting capacity or by increasing barriers to entry. Since com-
petitive performance tends to follow industry structure, there is no
indication from structural changes that loss cost reporting will alter
the competitive behavior of the property and casualty industry.

Market Conduct

This section describes how loss cost reporting affects insurer busi-
ness practices and operating costs. Company operations could be ex-
pected to change in the following areas: 1) acquisition of expertise
needed to prepare final filings and rate manuals, 2) delays in pro-
cessing rate revisions, and 3) costs of rate preparation and filing. As
discussed below, the impacts in these areas vary by company size,
line of insurance, and market share. ISO currently develops rates for
14 lines of insurance. In two lines, private passenger auto and home-
owners insurance, it does not file final rates in Wisconsin. Instead it
sends prospective loss costs to regulators and member companies.
Each company is responsible for developing its own independent rate
filing by using ISO loss cost, another statistical agent's loss experi-
ence, its own experience, or a weighted combination of all of factors.
For personal lines of insurance, the new ISO procedures should have
absolutely no impact on company operating cost or pricing behav-
ior.

In the other 12 lines in which ISO files final rates, its members freely and consistently deviate from the rates and rules filed on their
behalf. For instance, each of the top 20 writers of commercial auto-
mobile insurance files deviations from ISO's rate, as well as filing
numerous independent filings of rate rules. Methods used to justify
the deviations vary considerably with companies citing judgment,

12. D. R. Anderson, et al., Competition in the Wisconsin Insurance Industry,
University of Wisconsin, School of Business, Aug., 1989; American Insurance
Association, Competition in the Property and Casualty Insurance Industry: An
Analysis of Seven Major Lines (1988); Robert Klein, Memorandum to Personal Lines
Committee of the NAIC, "Initial Analysis of Competition in Private Passenger
Auto and Homeowners Insurance" (Feb. 7, 1989).
experience, and competitive pressures. Even companies as large as State Farm Mutual feel compelled to use ISO data as a starting point for their rate setting. In its actuarial memorandum justifying its most recent commercial auto rates, State Farm Mutual Automobile Insurance Company said

Presently, we have about 3,000 commercial vehicles insured. Due to our small volume of data, we have traditionally geared our rate levels on commercial vehicles to some reasonable departure below the current effective rates for the Insurance Services Office.13

In this case the deviation from ISO was modeled based on the company’s profitability trends.

Companies tend to use advisory rates only as a jumping off point for their own estimates, evaluating how closely the bureau’s loss experience matches their own market niches. For instance, in private passenger auto or apartment property insurance, companies reporting to ISO do not insure a representative sample of overall Wisconsin risks because the large writers elect to report their loss experience to other statistical agents.

Even when the ISO data are representative of the state as a whole, each company’s underwriting and rate rules are different and produce a book of business with its own unique risk characteristics. Thus, an ISO member company would be compelled to evaluate the relevance of ISO loss experience for its own expected book of business.

However, a rate advisory organization’s loss experience is still useful in the rate setting process. As one company officer put it, “ISO is the benchmark. The more you depart from it, the riskier that decision seems, and the more you need to justify it in your own mind.”14

To further appreciate the limits of ISO on pricing behavior for commercial lines, one should understand all the devices by which actual prices charged per exposure unit can be adjusted by insurers. When a large commercial account is put up for a competitive bid,
agents discuss the terms that might be needed to win or retain an account. These factors would be compared to anticipated loss experience, expenses, and investment income to determine if the competitively required price was worth matching. Insurers use a combination of package modification factors and individual risk modification factors to reduce the rate charged from the filed rate for the classification of risk. Factors that might legitimately be considered by the underwriter in assigning credits and debits are "premises condition," "management cooperation" and "classification peculiarities." Finally, the underwriter might be willing to reduce his bid to reflect the potential for his own company's safety engineers to trim the historic loss experience of that account.

These kinds of activities constitute bona fide forms of market competition. Impermissible competition or excesses might involve misrepresentation of the size and nature of the risk by the agent in order to secure a low enough quote for the insurer to win/save a client. One example would be misclassifying a risk; e.g., calling a general liability applicant a "sheet metal shop" rather than its true class "pressure tank manufacturer." Another practice would be to underestimate the exposure units, such as payroll or square footage. These misrepresentations are not a general form of conduct by agents; they tend to manifest themselves more often in tight markets.

Even were ISO to have the strict compliance rules insisted upon by the fire bureaus of the 1930s, the above forms of competitive price setting would make enforcement of cartel pricing difficult to sustain. The history of cartel pricing has shown that without active government enforcement of the cartel's price schedule, individual members will price to maximize their own profitability, not the collective profitability of the cartel.

The fact that companies will be forced to recognize officially their own expense loadings is not only consistent with the rating laws in Wisconsin, it also makes good sense from a management control viewpoint. Before promulgating a rate, company management should at least look at its documented expenses and determine that the rate it is proposing offers a reasonable chance of recovering both loss and administrative expenses. Company operations will be

largely unaltered for companies that write more than a token amount of business in any of the personal lines. Commercial writers with trivial Wisconsin writings may wish to withdraw entirely rather than undergo the additional expense of filing expense loadings and communicating them to their agents. Insurers with agents that are actively marketing their products should find that loss cost filings will not alter their rate setting practices or expenses at all.

Regulatory Systems

This section defines the performance standards by which rates are measured in states like Wisconsin that have adopted the NAIC Model Competitive Rating Act. The impact of loss cost filing on achieving these standards is discussed, along with regulatory workload implications.

Systems for rate regulation vary considerably from state to state. Hence, the impact of loss cost filing will also vary. Wisconsin is best described as a "use and file" state. State law on rate regulation follows the NAIC model act, that is, the law provides that rates reasonably reflect anticipated loss experience and actual expenses for a given class of insureds. Rate making is an amalgamation of statistical rigor and expert judgment. In monitoring rates for compliance with the rate law, Wisconsin regulatory staff look mostly to see that conventional techniques have been applied under appropriate circumstances. We recognize that a substantial judgmental element enters into ratemaking, particularly for companies that are forced to follow competitive pressures.

Following is a brief description of the mechanics of ISO's rate filing process in Wisconsin [before the change to loss cost reporting only]. Each quarter ISO filed a report with the Wisconsin department indicating which companies it had the authority to file rates for on particular lines of insurance. In March of 1999, for example, it showed that it had authority to file commercial auto rates for 284 companies licensed in Wisconsin. As their licensed agent, the commercial auto rates filed by ISO could then be validly used by all 284 companies without justification or further communication with our office. About half of these companies filed some sort of rate or rule modification each year.
After ISO restricted its filings to loss cost, only each company that wished to continue writing commercial auto need file with our office. The exact nature of the filing has yet to be determined. It could, however, be as minimal as a one time filing of an expense factor, which would be accepted by the office until modified by the insurer. The ISO loss cost filing and the insurer's individual expense factor could then constitute a complete rate filing. As each new line of business is switched to loss cost reporting, there will be a large one time increase in the number of filings. The number of separate rates filed for the commercial lines might be expected to double after loss cost only filings are implemented.

Although the number of separate filings will increase, the amount of regulatory scrutiny given to them will not increase commensurately for two reasons: First, the filings need not justify the primary component of the rate, i.e., prospective losses (ISO will have done that already). Second, the expense element is generally well documented and not likely to change much from the last insurance expense exhibits to the prospective rate period.

To put our regulatory mission in its proper perspective: The areas that we should be giving the most attention to are the ones that contribute most to rate volatility and departures from the statutory standards. These include: 1) developing and trending future losses, and 2) applying individual risk modification factors. Neither will be affected whatsoever by loss cost reporting.

Expense factors are simply not a major element in rate distortions or potential abuse of statutory rating criteria. The anticipated level of expenses is far less important than losses for three reasons: 1) they are relatively small (15% to 40% of the final rate depending on the line of insurance); 2) they seldom vary much from year to year, and 3) they are well documented.

Few active writers of commercial lines would simply accept the ISO commercial rate filings without some form of deviation from the ISO program. The most common forms of deviation are:

- Across the board deviations—in this case, the insurer informs the regulator that it is deviating upward or downward from the overall rate or a class of rates filed by its rate advisory agent;
- Rule changes—the insurer files its own modifications to the rate rules which govern the way the rate will be applied, including definitions, exclusions, and underwriting limitations;
• Independent filings—the most extreme departure from the rate advisory organization, it is a completely independent development of rates and rules using methods and data supplied by the insurer itself.

There are two other forms of departure from rates filed by ISO or any other rate advisory organization:

• Package modifications in which the insurer offers discounts for combining more than one coverage under a package policy;

• Individual risk modification factors in which the underwriter adjusts the premium for anticipated differences in the hazards being insured.14

While deviations from ISO filings must be filed with our office, individual risk modification factors need not be justified separately so long as they fall within the overall rules filed with us. Using modifications to account for the increased or decreased hazards of an individual insured, the insurer can modify the base filed rate for that class of insureds upward or downward by as much as 50 per cent. Thus, by means of the application of some subjective underwriting criteria, the insurer can control the actual rate within wide bounds without ever filing the overall rate for that line of insurance. This fact is a very significant cause of rate volatility during the insurance underwriting cycle, since credits are liberally given during soft markets and debits just as freely applied during the opposite end of the cycle.

Results from a special rate monitoring report required by the Wisconsin Commissioner help to illustrate the tremendous magnitudes by which companies deviate from rates filed on their behalf by ISO. The report asked the top 20 commercial lines writers to report deviations from advisory stemming from three sources: 1) filed deviations from ISO, 2) package discounts, 3) individual risk modification factors. Below are the range of average percentage deviations reported by individual companies for the third quarter of 1989 for two lines of commercial insurance:

14. There are other cost departures due to experience modification factors or retrospective rating plans which can result in substantial modification of the charges paid by individual insureds. However, these rate modifications derive from the loss experience of the individual insured, not a general rate level set by the insurer.
<table>
<thead>
<tr>
<th>Deviation from ISO (range of company average deviations)</th>
<th>Individual Risk Modifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Fire/EC</td>
<td>-23 to 20%</td>
</tr>
<tr>
<td>Premises and Operations</td>
<td>0 to -25%</td>
</tr>
</tbody>
</table>

Those critics of ISO who regard ISO as a mechanism for enforcing cartel pricing need only look at the very clear tendency of member companies to deviate from its filed rates to see that ISO would be an abject failure as a price control mechanism. The table above shows that one ISO member deviated downward from the ISO filed rate by an average of 23 per cent while another company deviated upward by an average of 20 per cent. Moreover, the range of discounting reported for individual risk characteristics was just as dramatic. There is no reason to believe that loss cost reporting will constrain in any way this penchant to deviate from filed rates.

The practice of receiving and reviewing rates will, in the long run, be similar to what would have existed in the absence of the ISO change to loss cost filings. We will continue to look for justification of rates in terms of both losses and expenses, but focus on the loss component because of its volatility. The forces of competition will have more to do with overall rates, class relativities, rules, and deviations from filed loss costs than any actuarial formulas. Thus, the change to prospective loss cost filings should have very little impact on the ability of the insurance industry to satisfy the performance criteria established in Wisconsin rate laws.

**Conclusion**

The change to loss cost should have little bearing on the number of insurers or their market shares because the cost of filing deviations from current ISO filings should be comparable to the cost of developing and implementing cost multipliers for loss cost.

The change to prospective loss cost will have the least impact in the personal lines. Several years ago ISO had already changed its policy to file only prospective loss costs for these lines. Moreover, personal lines writers make relatively little use of ISO (or any other
advisory organization's loss experience for overall rating, though it is used for certain relativity factors, such as auto symbols or excess limits factors.

Insurers in commercial lines will still rely on ISO loss experience to assist in their rate setting. However, deviations from ISO rates and rating rules are very common today and will probably be no less frequent after the change to loss cost only. For most commercial lines companies adding an expense loading will be no more complex or costly than multiplying the ISO rate by a deviation factor.

The greatest impact will be on small insurers or large insurers with a small market share in a given state. They will be forced to develop new procedures for developing their final rates and rate manuals. Small companies may be forced to rely on outside assistance to transform prospective losses into rates and to prepare final rate manuals. These factors will add somewhat to their cost of operations.

Regulators in competitive rating states will likely see a modest increase in the rate filings from companies writing extremely small volumes of commercial business in their states. These activities that would ordinarily have used just the ISO filed rates (possibly with existing rate deviations) rather than go through the expense of filing independently.

The quality of the filings from the smaller insurers is apt to improve. Many smaller insurers are taking a hard look at how they went about preparing and justifying their rates. They are now motivated to take a fresh look at their individual expense factors and incorporate these into their rate levels. This additional review is bound to improve the stability and adequacy of their rate setting.
Personal Automobile: Actuarial Ratemaking, Residual Markets, and Fraud

Introduction


A distinguishing mark of the discerning insurance research paper is that it accurately predicts the future course of the industry. Likewise, the ultimate goal of many practical insurance papers is that companies revise their strategies according to the recommendations that the papers provide, thereby expanding the availability of insurance and enhancing the public’s welfare.

If so, then Judith Mintel’s pair of masterful papers on insurance residual markets combine research and practice in perfect proportion. They demonstrate how a keen understanding of marketplace pricing can help casualty actuaries formulate more efficient mechanisms for providing insurance coverage to the public.

Residual markets are particularly important in personal automobile insurance and in workers’ compensation. In these lines of business, insurance coverage is mandatory in most jurisdictions, ex-
ther because of compulsory insurance laws (as in workers' compensation) or because of financial responsibility laws (as in personal automobile insurance). But not all risks are "insurable." For some applicants, the cost of insurance is prohibitively high for other applicants, the lack of data to accurately project future loss costs makes insurers unwilling to assume the risks.

The populace rightly says: "If insurance is mandatory, there must be a means for even the 'insurable' risks to obtain coverage." So the insurance industry, in cooperation with state legislatures and insurance departments, has formed residual market mechanisms for these two lines of business. Applicants who are unable to obtain insurance coverage in the voluntary market may obtain coverage in the residual, or "involuntary," market.1

During the past two decades, residual markets have ballooned in many jurisdictions. During the later 1980s, for instance, the workers' compensation residual markets were servicing about 25% of the business nationwide, more than double the market share for even the largest private carrier. In some states, in fact, such as Maine and Rhode Island for workers' compensation, and Massachusetts and New Jersey for personal automobile, a majority of insureds were being directed to the residual market mechanisms.

Insurers wonder: "What forces drive the growth of the residual markets?" Since the operating losses of the involuntary markets are funded by private carriers, the size of these markets and their financial results affect the premium rates of voluntarily written insureds. Pricing actuaries include a "residual market load"—a projection of the future loss from the involuntary market—as an expense element in their rate reviews.

The traditional answer to question posed above has been: "Rate adequacy in the voluntary market is the primary determinant of the growth of the involuntary market. When voluntary market rates are adequate, most insureds can obtain coverage from private carriers, and the residual market 'depopulate.' When voluntary market rates are inadequate, companies decline to insure many applicants, who are then forced to seek coverage in the residual markets."2

Some actuaries and economists have refined this answer: "Overall rate adequacy is only half the story, the other half is the avail-

1. In some jurisdictions, applicants who are unable to obtain workers' compensation insurance in the private market may obtain coverage from a "state fund," thereby obviating the need for a separate involuntary market.
ability of proper risk classification relativities. The overall rate level in the state may be adequate. But if insurers are not permitted to charge higher premiums for higher risk insureds—such as young, unmarried, male drivers—then these insureds will end up in the residual markets.

"Wait," says Judith Mintel in the first of her papers included here [Pricing Private Passenger Automobile Insurance]. "There is a third driving force, besides overall rate adequacy and the availability of proper rate relativities: namely, the rate differential between the voluntary and involuntary markets."

All too often, says Mintel, state insurance commissioners suppress the residual market rates, for a variety of reasons. "Why should some drivers not only have to suffer the stigma of being unwanted risks but also have to pay more for this privilege?" No matter, says Mintel, that these drivers do in fact cause more accidents. So many states have mandated that residual market premium rates be kept in line with voluntary premium rates.

Mintel documents the results in four states with significant residual markets: New Jersey, New York, Pennsylvania, and Michigan. For many risks, the residual markets in these states offered competitive rates. And for some high rated classifications, the residual market offered the lowest rates among the major carriers.

Residual markets are not all alike. Most automobile residual markets are "assigned risk mechanisms," where each insurer operating in the state is assigned a certain number of applicants who are unable to obtain coverage in the voluntary market. Companies are thereby encouraged to control their expenses and adjudicate claims equitably for these insureds just as they do for voluntary market insureds, thereby reducing their costs and optimizing the financial rewards of providing insurance.

Some automobile residual markets, however, are "pooling" mechanisms. Each insurer remits to the pool the premiums that it receives from the "involuntary" insureds, and it is reimbursed by the pool for any losses that it pays to claimants. In most involuntary pools, a small number of "servicing carriers" handle the involuntary business in "reinsurance" pools, all carriers operating in the state handle the involuntary business. In these pooling mechanisms, Mintel says in the second of her papers [Anti-Competitive Effects],

2. The number of assigned risks allocated to each carrier is generally proportionate to the company's premium volume in the voluntary market.
carriers have little incentive to keep expenses down or to settle claims favorably for the company, since all costs are reimbursed by the involuntary pool. Residual market pooling mechanisms hamper competition in the insurance marketplace and lead to inefficient operations among insurance companies.

Mintel wrote these papers in the early 1980s. The automobile insurance industry took her advice, keeping "assigned risk" residual market mechanisms instead of involuntary pools, and striving to make residual market premium rates as self-supporting as possible.

In contrast, the workers' compensation industry had involuntary pools in most jurisdictions, with little (if any) difference in rates between the voluntary and involuntary markets. Many agents preferred the involuntary pools, since they demanded little work on the agent's part, many insureds liked the competitive rates offered by the pools, and the carriers had little incentive to control costs. A death spiral soon ensued: the pools grew steadily, increasing the burden on voluntarily written insureds, and forcing companies to shop even more of their applicants to the pools. In some states, such as Maine and Rhode Island, the residual pools garnered the majority of the market, and the private insurance system eventually collapsed.

Mintel's two-pronged recommendation is no less applicable to workers' compensation than to automobile insurance: increase the rate differential between the voluntary and involuntary markets, and provide incentives to carriers to service the business more efficiently. Accordingly, in the 1990s, premium discounts and financing plans were removed from involuntary market policies in many states, and "Dutch auctions" were held in which companies bid on their expense fees to become servicing carriers.\(^3\)

The results were immediate. By the mid-1990s, the specter of ever-burgeoning pools suffocating the voluntary markets had faded, and the severe "residual market burden" in many states had dissipated.

The lesson for casualty actuaries is clear. If all one sees is the numbers—which one trends, develops, or even triangulates—the problems that one discovers have no visible remedies. But if one understands the driving forces behind the problems, solutions may be found even for the thorniest of them.

\(^3\) In other words, only companies which accepted low expense remunera-
tions were invited to be carriers to the pools, thereby enhancing the efficiency of residual market operations and reducing costs.
The Effects of the Pricing of Private Passenger Automobile Insurance Sold through Residual Market Mechanisms on Competition and Market Structure

Judith K. Mintel*

It is a basic economic fact that when there are several competing suppliers of a product or service, and price is a dominant factor in consumer choice, the supplier with the lowest price will tend to gain larger shares of the market. This fact has been demonstrated in the sale of private passenger automobile insurance over the last several decades as companies with lower rates have dominated more established competitors with higher rates by growing significantly. Recently, a new and powerful competitive force in the marketing of automobile insurance has been created by state governments through artificial suppression of residual market rates. Residual market mechanisms for private passenger automobile insurance exist in every state. These mechanisms were originally established for the purpose of providing insurance to those who were unable to obtain insurance from a company voluntarily. This original purpose has been abandoned in a few states, and using charges of arbitrary or unfairly discriminatory insurance company practices, governments

* Counsel, State Farm Insurance Companies
have artificially suppressed residual market rates, making these mechanisms more and more competitive with other insurers. These charges of unfair discrimination assume that growth in the residual market is the result of insurance company practices rather than consumer reaction to government-controlled pricing policies. This article challenges this assumption with an analysis of the effects of residual market prices on competition and market structure using rate comparisons and an examination of changing market shares in selected states.

The typical residual market mechanism is an assigned risk plan or Automobile Insurance Plan (AIP). A description of how an assigned risk plan operates follows. Any licensed agent or broker may submit an application for insurance to the AIP distribution center. The applicant is then assigned to a private insurer in proportion to its share of the voluntary market in that state. The insurer to whom the applicant is assigned is required by law to issue coverage to the applicant at the rate established by the rating organization authorized to file rates on behalf of the plan.

During the 1970s several states adopted alternative residual market mechanisms by law or by regulation. Joint underwriting associations have been established in Florida, Hawaii, Missouri, and Michigan; reinsurance facilities have been organized in Massachusetts, New Hampshire, North Carolina, and South Carolina; a syndicate has been created in Maryland. With the exception of the reinsurance facilities in Massachusetts, New Hampshire, and South Carolina, rates for automobiles insured through the residual market mechanism are established separately from the rates for automobiles insured voluntarily. In those states with reinsurance facilities, except North Carolina, insurers are required to accept all applicants, and separate rates for those insured involuntarily are prohibited. Insurers are allowed to cede or reinsure inadequately priced business in a pooling arrangement in which all insurers must share the costs.

In almost all states, a separate rate level for those insured through a residual market mechanism is required and all automobile insurers licensed to write in the state must become members of the rating organization known as AIPEO (Automobile Insurance Plans

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1. North Carolina's reinsurance facility is a hybrid residual market mechanism due to loss recoupment provisions and different laws applicable to the various automobile insurance coverages.
Service Office. AIPSO's function is to collect statistical data concerning the losses and expenses of insurance companies applicable to residual market automobile business, develop rate level indications through an actuarial analysis of this experience, and file the necessary rate revisions with the state regulatory authority. Once a rate filing is approved, AIPSO distributes rate pages and manual rules to all companies and agents writing automobile insurance in the state for use with residual market policies.

The traditional thinking has been that if rates for risks insured voluntarily are adequate, the residual market will be small and the problems created by the operation of the residual market insignificant. Most insurance industry analysts have assumed that overall rate adequacy in the voluntary market is the dominant factor in determining the size and market influence of the residual market. This assumption seems to be based on the belief that if companies are allowed to charge an adequate rate on voluntary business, this, in and of itself, would provide the necessary incentive to write more business voluntarily resulting in a small residual market. As a result, the conscious decision in some states to underprice insurance sold through the residual market while allowing relative freedom in the pricing of voluntary business is viewed by many as of minor significance. The resulting residual market losses have been accepted by most insurance companies as a routine cost of doing business. This attitude is bolstered by those who view a subsidy of residual market rates by voluntary business as necessary and appropriate for social reasons to prevent an increase in the uninsured population and to make insurance more affordable. It is also supported by those who view the creation of a subsidy within voluntary rates as the only politically feasible way of achieving overall rate adequacy in the private passenger automobile insurance line.

The recent experience in several states indicates that this traditional thinking is not adequate to explain much of the growth in residual markets that is occurring in those states. In fact, this experience shows that the prohibition or limitation of specific risk classifications, including the affirmative suppression of residual market rates, can destroy a healthy and competitive private insurance marketplace even when rate levels in the voluntary market are not inadequate or subject to arbitrary suppression by government. While there may be many causes of temporary growth in residual market populations, including the underwriting cycle, inflation, in-
creased theft rates, rising medical costs, compulsory insurance laws, and the judicial climate; these causes are not likely to result in a substantial and sustained increase in the proportion of risks insured through residual markets. The effects of these phenomena on the size of the residual market are felt only in the short term until rates levels are adjusted or additional capacity is made available.

The single major cause of long-term growth in the residual market is government regulatory activity with regard to rating, not only in the area of overall rate adequacy in the voluntary market but also in the area of risk classification and rate differentials. Not surprisingly, the area having the largest impact on residual market growth is the existence and magnitude of the rate differential based on whether or not the risk is insured voluntarily. Thus, the pricing of insurance purchased through the residual market mechanism is, in a growing number of areas, a dominant factor in creating noncompetitive or restrictive marketing practices by personal lines companies. Ironically, in those states where residual market rates have been artificially depressed, the result has often been to create barriers to obtaining insurance line. These results are exactly the ones that the tolerance of an inadequately priced residual market was intended to prevent.

The most common justification for government suppression of residual market rates is that an individual with a "clean" driving record should be entitled to the same rate as any other diver with a similar record. The fact that a number of drivers who are unable to purchase insurance through normal channels have no evidence of recent driving citations or accident involvement is cited as evidence of poor underwriting judgment. Insurance company underwriting decisions are characterized as arbitrary and unfairly discriminatory, and it is alleged that applicants are rejected for reasons which bear no relationship to the applicant’s propensity to cause automobile accidents. This reasoning assumes that past driving record is the single permissible factor that is appropriate in assessing future accident potential, and it assumes that cars are insured in the residual market solely because they have been arbitrarily rejected by private insurers. These allegations are used as the justification for ignoring

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actual loss and expense experienced in the fixing of residual market rates. Theoretically, the loss of income resulting from inadequate residual market rates is intended to be made up of the government program is never emphasized when advocating its adoption or continuation and only occasionally accomplished.

Regulatory activity over the past several years involving the rate classification based on voluntary versus nonvoluntary business has been of both the legislative and administrative variety. The administrative action that has directly and immediately resulted in a large and sustained increase in the size of the residual market has been to establish residual market rates at a level so inadequate as to act as a "cap" or maximum on voluntary rates. While a rate applicable to voluntary business may be adequate to insure that business by itself, insurers may avoid writing business voluntarily because the penalty for writing more business is to increase the company's share of the highly unprofitable residual market. More importantly, insurers are prevented from raising voluntary market rates to achieve overall rate adequacy because those rates might then exceed rates in the residual market. Because every insurance agent and broker is capable of placing business through the residual market, any company with a rate in excess of the residual market rate can be effectively priced out of the market. The eligibility criterion, sometimes present, that only those unable to obtain coverage voluntarily can apply for residual market coverage is unenforceable and becomes increasingly meaningless as residual market rates become more competitive.

The existence of an inadequate rate for residual market business narrows the range and variety of voluntary market rates and reduces the number of competitors in the marketplace and the amount of price competition. The fact that the average residual market rate may be higher than the average voluntary rate available from those insurers who are the most active in the market does not eliminate the adverse competitive effects of inadequate residual market rates. Any significant inadequacy in residual market rates necessarily limits the extent to which some companies would charge more than the average voluntary rate and others would charge less. The greater the inadequacy of residual market rates, the greater the rate-flatting

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3. The overall rate level or average rate is the total cost including losses, expenses, and profit of providing insurance to all insured cars divided by the number of cars.
effect and the more damaging to competitive forces. The reduced competition is manifested by the reduction of the number of individual insurance company competitors in the market. Reduced competition also is manifested by the number of companies that are able to charge a price that is competitive with the price available through the residual market mechanism in a number of specific rate classifications and territories.

The anticompetitive effects of the government policy involving artificial suppression of residual market automobile insurance rates can be observed most clearly in New Jersey, New York, Pennsylvania, and Michigan where the rates filed by AIPSO and made applicable to policies issued through the automobile insurance residual market mechanism have been fixed by government at a level that is inadequate to cover the losses and expenses applicable to those policies. In New Jersey, this policy has been adopted by the commissioner on an ad hoc basis in conjunction with every rate filing made by AIPSO since that organization came into existence in the early 1970s. In New York, the suppression of AIP rates is accomplished through the misinterpretation and misapplication of a decision made by Superintendent Richard Stewart in 1971. This decision sets forth a specific formula, known as the "Stewart Formula," which has been followed in conjunction with all subsequent rate filings. The setting of inadequate rates for the Pennsylvania AIP also has been affected through administrative decisions with regard to rate filings, although the AIP rate inadequacy in Pennsylvania is less significant in terms of number of dollars and of more recent vintage than that in New York and New Jersey. In Michigan, as a part of legislation which became effective January 1, 1981, rates for the Michigan Joint Underwriting Association (JUA) are required by law to be fixed at a level which is related to an average of rate charged in the voluntary market. In all four of these states, as well as in a number of others adopting similar policies, there exists unusual growth in the residual market and a lack of insurer profitability in the automobile insurance line, reducing capacity in the market and increasing government involvement in insurance company underwriting and rating decisions. The effects of inadequate residual market rates on competition in

4. In terms of losses as a percentage of earned premium, the rate inadequacy in Pennsylvania during the last year was larger than that in New Jersey and New York.
these four states can be seen most effectively through a comparison of rates for specific risks. In New Jersey, the rate comparison contained in Table 1 was introduced as an exhibit in a hearing held in July of 1982 by the New Jersey Office of Administrative Law concerning a rate increase application filed by AIPSO. The informal pricing policy established by the state of New Jersey has been that the base rates approved for the AIP will be identical to the base rates approved for the Insurance Services Office (ISO), the rating organization having the largest number of members. However, the rate classifications and relativities of the ISO and the AIP are not required to be the same and a "policy constant" or uniform dollar amount per car is added onto the premium for all automobile policies. The theoretical purpose of the policy constant is to make up the shortfall caused by the setting of AIP rates without regard to actual costs. Thus, although the average AIP rate is similar to that of ISO and higher than that of Prudential and State Farm, the application of the different rate classification systems to the base rate creates unexpected results. In a number of instances, the rate for a policy issued through the New Jersey AIP is lower than that for a comparable policy from any major company in the voluntary market. Those risks that are most likely to receive a lower rate through the AIP are those in the higher rate classifications, such as cars having youthful drivers and those garaged in urban areas.

During presentation of evidence in conjunction with the same New Jersey rate filing made by AIPSO, a witness representing State Farm testified that 20 percent of the business currently insured voluntarily by State Farm in New Jersey could obtain a lower rate by purchasing a similar insurance policy through the New Jersey AIP. The State Farm witness concluded that with approximately 40 percent of all automobile insurance business insured through the AIP, the existence of a lower rate in the AIP potentially explained at least one half of the residual market population. The AIP had become the competitor with the lowest rate for a significant portion of the automobile insurance market in New Jersey.

<table>
<thead>
<tr>
<th>State</th>
<th>Form</th>
<th>ISO</th>
<th>Rate Comparison [Semiannual Rate]</th>
<th>$100 Comprehensive, $100 Collision</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td>new jersey private passenger package</td>
<td></td>
</tr>
<tr>
<td>HUNTERDON, SUSSEX, AND WARREN COUNTIES</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>$271.58</td>
<td>$288.50</td>
<td>$320.00</td>
<td>$252.00</td>
</tr>
<tr>
<td>Single Female Principal</td>
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<td>289.00–320.00</td>
<td>320.00</td>
<td>318.00</td>
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<td>Single Male Principal</td>
<td>1,011.93</td>
<td>666.00–882.00</td>
<td>761.50</td>
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<td>NORTHERN BERGEN COUNTY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>332.96</td>
<td>311.00</td>
<td>346.00</td>
<td>329.00</td>
</tr>
<tr>
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<td>813.00</td>
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<td>TRENTON</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>334.50</td>
<td>282.50</td>
<td>310.00</td>
<td>291.00</td>
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<td>740.50</td>
<td>710.00</td>
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<tr>
<td>BAYONNE</td>
<td></td>
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<td></td>
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<tr>
<td>Adult Pleasure Use</td>
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<td></td>
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<td>Over 7,500 Miles</td>
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<td>Single Female Principal</td>
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<td>410.50</td>
<td>480.00</td>
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<td>Single Male Principal</td>
<td>1,579.17</td>
<td>899.00–1,109.00</td>
<td>993.00</td>
<td>951.00</td>
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<td>NEWARK</td>
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<tr>
<td>Adult Pleasure Use</td>
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<td>500.82</td>
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<td>Single Female Principal</td>
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<td>1,545.00–2,068.00</td>
<td>1,677.00</td>
<td>1,385.00</td>
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</table>
In New York, the rates for compulsory coverages purchased through the AIP are set at a level which is halfway between the indicated rate for those insured voluntarily and the fully adequate AIP rate. This formula was adopted by Superintendent Stewart in 1971 as a first step toward basing AIP rates exclusively on AIP loss and expense experience. Prior to 1971, AIP rates in New York had been identical to the rates established by the largest rating organization for risks insured voluntarily. In his decision Superintendent Stewart concluded that:

No persuasive arguments exist in favor of making all motorists pay for losses generated by motorists insured through the assigned risk plan...there is not justification for the continuation of the present subsidy which runs from one group to the other.\(^6\)

Nevertheless, because Stewart found that the current AIP rates had created “legitimacy expectations,” he proposed a reduction of the subsidy rather than its immediate elimination. The clear implication of his decision, however, was that the entire subsidy would be eliminated over time and that AIP rates should eventually be based exclusively on AIP loss and expense experience.

This policy of phasing in cost-based pricing was not followed by Stewart’s successors. Instead, New York’s insurance regulators have continued to apply the Stewart formula to subsequent rate filings made by AIPSO, and, recently, Superintendent Lewis has proposed that application of the Stewart formula be expanded to apply to rates for optional coverages issued through the residual market mechanism. The result of this rate regulatory approach is similar to the results described above for New Jersey. However, the percentage of the driving population that can obtain a lower rate through the New York AIP is probably less because the AIP rate suppression in New York is less severe.

Rate comparisons published by the New York Insurance Department in its “1981 Consumers Stopping Guide for Automobile Insurance” indicate that the AIP rate may be the lowest for those drivers who are in the higher rated territories and classifications. (See

Tables 2, 3, and 4] It is interesting to note that the companies with the largest market share in New York, such as Allstate and State Farm who are generally considered to have the lowest overall rates and to be the most aggressive competitors, are much more likely to have rates in excess of the AIP rate in the higher rated classifications and territories than those companies who are rate bureau members of who do not emphasize the sale of personal automobile insurance.

In Pennsylvania, the rates for automobile insurance policies issued through the AIP have become increasingly inadequate over the last five years. Unlike the policies adopted by the regulatory authorities in New Jersey and New York, the Pennsylvania Insurance Commissioner has not overtly moved away from basing AIP rates primarily on projections of AIP loss and expense experience. Instead, the commissioner has consistently adopted rate projections in conjunction with filings made by AIPSO that have proven to be extremely low. This has been accomplished primarily by regulatory delay and by using steeply negative loss frequency trends and conservative loss cost trends as well as generous estimates of investment income. Also, in recent years the commissioner has made findings that the allocation of expense experience between policies written voluntarily and those written through the AIP is in error and, therefore, that the expense component filed by AIPSO is too high. This finding has been used to further reduce AIP rate increases. Because there is no controversy concerning whether the expenses were actually incurred, the commissioner also has approved the addition of a dollar amount per car to be added to the uninsured motorist coverage premium for policies issued both voluntarily and involuntarily. This amount has been designated as the "expense constant:"

The result of this rate regulatory policy has been to reduce the rate differential between those insured through the AIP and those insured by companies voluntarily in a number of rate classifications and territories. This can be seen through a rate comparison prepared from the various rate manuals on file with the Pennsylvania Insurance Commissioner. [See Table 5.]

Rather than establish competitive residual market rates through administrative or regulatory actions, Michigan, by legislative action, elected to move away from cost-based automobile insurance pricing effective in 1981. The new law prohibits the use of sex and marital status as rate classifications and requires significant territorial rate compression. It requires that every insurer provide coverage to all
<table>
<thead>
<tr>
<th>Adult Male—Age 35</th>
<th>$10/ $20,000 Bodily</th>
<th>$50,000 Basic</th>
<th>$5,000 Property</th>
<th>Comprehensive</th>
<th>Collision $10,000 Raised to $20,000</th>
<th>Bodily No-Fault Raised to $100,000</th>
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<tr>
<td>Assigned Risk</td>
<td>184</td>
<td>97</td>
<td>81</td>
<td>362</td>
<td>376</td>
<td>418</td>
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<td>Aetna Casualty &amp; Surety Co.</td>
<td>137</td>
<td>68</td>
<td>75</td>
<td>280</td>
<td>173</td>
<td>301</td>
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<tr>
<td>Allstate Ins. Co.</td>
<td>163</td>
<td>106</td>
<td>90</td>
<td>359</td>
<td>174</td>
<td>266</td>
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<td>Amica Mutual Ins. Co.</td>
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<td>83</td>
<td>259</td>
<td>99</td>
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<td>Federal Ins. Co.</td>
<td>132</td>
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<td>74</td>
<td>304</td>
<td>121</td>
<td>304</td>
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<td>Firemen’s Ins. Co. of Newark</td>
<td>415</td>
<td>68</td>
<td>76</td>
<td>269</td>
<td>116</td>
<td>276</td>
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<tr>
<td>General Acc. F. &amp; L. Assur. Corp.</td>
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<td>56</td>
<td>76</td>
<td>259</td>
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<td>Government Employees Ins. Co. **</td>
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<td>84</td>
<td>66</td>
<td>295</td>
<td>225</td>
<td>297</td>
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<td>Hartford Acc. &amp; Ind. Co.</td>
<td>140</td>
<td>108</td>
<td>90</td>
<td>358</td>
<td>108</td>
<td>306</td>
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<tr>
<td>Ins. Co. of North America</td>
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<td>38</td>
<td>90</td>
<td>266</td>
<td>150</td>
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<td>63</td>
<td>104</td>
<td>300</td>
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<td>Lumbermen’s Mutual Cas. Co.</td>
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<td>107</td>
<td>326</td>
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<td>358</td>
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<td>State Farm Mutual Auto. Ins. Co. **</td>
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<td>Adult Male—Age 35</td>
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<td>Bodily Injury to $100/No-Fault Raised to $300,000</td>
<td>Optional Insurance**</td>
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<td>Bodily Injury</td>
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<td>Assigned Risk</td>
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**Premiums based on annual mileage over 7,500.

***Amounts under "Optional Insurance" represent additional premiums.
## TABLE 4

### Annual Premium Costs for Automobile Insurance

**Territory: Albany**  
**June 30, 1981**

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<th>Adult Male—Age 35</th>
<th>$100-$20,000 Bodily Injury &amp; Encompassed Motorists</th>
<th>$50,000 Basic Property Damage</th>
<th>$5,000 No Fault</th>
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<th>Collision $200 Decl.</th>
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<td>583</td>
<td>85</td>
<td>313</td>
</tr>
<tr>
<td>State Farm Mutual Auto. Ins. Co.</td>
<td>247</td>
<td>121</td>
<td>177</td>
<td>545</td>
<td>68</td>
<td>315</td>
</tr>
<tr>
<td>Travelers Indemnity Co.</td>
<td>172</td>
<td>112</td>
<td>194</td>
<td>478</td>
<td>66</td>
<td>342</td>
</tr>
<tr>
<td>U.S. Fidelity &amp; Guaranty Co.</td>
<td>177</td>
<td>118</td>
<td>160</td>
<td>455</td>
<td>43</td>
<td>303</td>
</tr>
<tr>
<td>Utica Mutual Ins. Co.</td>
<td>197</td>
<td>105</td>
<td>148</td>
<td>488</td>
<td>48</td>
<td>318</td>
</tr>
</tbody>
</table>


**Premiums are based on annual mileage over 7,000.

***Amounts under "Optional Insurance" represent additional premiums.
<table>
<thead>
<tr>
<th>State Farm</th>
<th>Mutual</th>
<th>Allstate</th>
<th>ISO</th>
</tr>
</thead>
<tbody>
<tr>
<td>PITTSBURGH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>$266</td>
<td>$506</td>
<td>$276</td>
</tr>
<tr>
<td>Single Male Principal</td>
<td>641</td>
<td>1,346</td>
<td>530</td>
</tr>
<tr>
<td>Operator Age 21-24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Female Principal</td>
<td>375</td>
<td>506</td>
<td>371</td>
</tr>
<tr>
<td>Operator Age 21-24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CENTRAL COUNTIES</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>189</td>
<td>476</td>
<td>202</td>
</tr>
<tr>
<td>Single Male Principal</td>
<td>498</td>
<td>1,261</td>
<td>397</td>
</tr>
<tr>
<td>Operator Age 21-24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Female Principal</td>
<td>283</td>
<td>476</td>
<td>279</td>
</tr>
<tr>
<td>Operator Age 21-24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHILADELPHIA—SEMI-SUBURBAN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>536</td>
<td>749</td>
<td>496</td>
</tr>
<tr>
<td>Single Male Principal</td>
<td>1,292</td>
<td>1,983</td>
<td>923</td>
</tr>
<tr>
<td>Operator Age 21-24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Female Principal</td>
<td>755</td>
<td>749</td>
<td>655</td>
</tr>
<tr>
<td>Operator Age 21-24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PHILADELPHIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>581</td>
<td>957</td>
<td>610</td>
</tr>
<tr>
<td>Single Male Principal</td>
<td>1,400</td>
<td>1,983</td>
<td>1,136</td>
</tr>
<tr>
<td>Operator Age 21-24</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single Female Principal</td>
<td>819</td>
<td>957</td>
<td>804</td>
</tr>
</tbody>
</table>

Rates shown are approximate and were calculated solely by reference to the manual without computer confirmation.
applicants except those with exceptionally adverse driving records. It also established a joint underwriting association which was originally intended to provide insurance to those few risks who could legally be rejected by private insures. The base rates for the JUA (which is officially referred to as the Michigan Automobile Insurance Placement Facility) are required to be set at the level which is a weighted average of the base rates of ten private insurers with the largest share of the Michigan automobile insurance market. Consideration of past and prospective loss and expense experience of those insured through the JUA is legally permissible only as a secondary part of the ratemaking process. Rate classifications and territories of the JUA are identical to those of the largest rating organization. None of the top five companies writing private passenger automobile insurance in Michigan are members of that organization. To the extent that these statutory rate standards result in inadequate income, the statute contemplates an increase in rates applicable to voluntary business. The results of these statutory rate standards can be seen in the rate comparisons contained in Table 6 which were prepared from the rate manuals on file with the Michigan Bureau of insurance. The rates available from the JUA for typical automobile insurance coverages are more attractive than those available from the major private insurers for specific risks, usually those in the higher rated classifications and territories.

An examination of the rates for specific risks focusing on the relative position of residual market rates vis-à-vis the rates available from private insurers voluntarily in these specific states suggests another explanation than the one usually given in response to why certain types of risks may be over or underrepresented in the residual market population. The reason that some drivers with certain characteristics purchase automobile insurance through the AIP or other residual market mechanism may be because it is the best bargain available from a price standpoint. In some states, the residual market rate is the most competitive available in a number of rate classifications and territories due to the adoption of rate regulatory policies by government which are not cost-based.

It is generally agreed that one of the major reasons for the growth in market share of certain insurers is that they have been able to offer the lowest price to an increasingly large segment of the market. Similarly, it must be acknowledged that the growth in the residual market population is related to both overall rate adequacy in the
**TABLE 6**

Michigan Private Passenger Automobile Package Rate Comparisons
Mandatory Coverages, Full Comprehensive
$100 Deductible Collision*

<table>
<thead>
<tr>
<th></th>
<th>JUA</th>
<th>Detroit-Auto</th>
<th>State Farm</th>
<th>Allstate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PONTIAC</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>$339</td>
<td>$296</td>
<td>$285</td>
<td>$342</td>
</tr>
<tr>
<td>Principal Operator Under 21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>911</td>
<td>630</td>
<td>696</td>
<td>691</td>
</tr>
<tr>
<td><strong>MARQUETTE</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>274</td>
<td>209</td>
<td>276</td>
<td>265</td>
</tr>
<tr>
<td><strong>INNER DETROIT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>447</td>
<td>453</td>
<td>405</td>
<td>466</td>
</tr>
<tr>
<td>Principal Operator Under 21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>1,202</td>
<td>985</td>
<td>968</td>
<td>812</td>
</tr>
<tr>
<td><strong>FLINT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult Pleasure Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>205</td>
<td>202</td>
<td>173</td>
<td>137</td>
</tr>
<tr>
<td>Principal Operator Under 21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over 7,500 Miles</td>
<td>912</td>
<td>663</td>
<td>742</td>
<td>456</td>
</tr>
</tbody>
</table>

*Source: Rate manuals on file with Michigan Insurance Department, December 1982.
Rates shown are approximate and were calculated solely by reference to the manual without company confirmation.

voluntary market and to artificially depressed residual market rates. Growth in the residual market population can be directly related not only to the adequacy in overall income but also to the extent to which the residual market rates for risks in specific classes and territories are competitive with those generally available in the voluntary market. (See Tables 7 and 8.)

The major beneficiaries of the adoption of a government program establishing the residual market mechanism as an effective competitor in the private passenger automobile insurance market are independent insurance agents and brokers who would otherwise lose
<table>
<thead>
<tr>
<th></th>
<th>1971</th>
<th>1981</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NEW JERSEY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Jersey AIP</td>
<td>$99,767</td>
<td>$674,700</td>
</tr>
<tr>
<td>1981 Ranking—Voluntary Business Only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Allstate</td>
<td>$113,926</td>
<td>$181,887</td>
</tr>
<tr>
<td>2. State Farm</td>
<td>39,655</td>
<td>96,521</td>
</tr>
<tr>
<td>3. N.J. Manuf.</td>
<td>44,531</td>
<td>84,943</td>
</tr>
<tr>
<td>4. Liberty Mutual</td>
<td>25,859</td>
<td>57,782</td>
</tr>
<tr>
<td>5. Prupac</td>
<td>6,081</td>
<td>64,457</td>
</tr>
<tr>
<td>Total Voluntary and AIP</td>
<td>$803,842</td>
<td>$1,593,424</td>
</tr>
<tr>
<td><strong>NEW YORK</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York AIP</td>
<td>$148,857</td>
<td>$552,353</td>
</tr>
<tr>
<td>1981 Ranking—Voluntary Business Only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Allstate</td>
<td>$208,820</td>
<td>$328,475</td>
</tr>
<tr>
<td>2. Aetna</td>
<td>101,375</td>
<td>151,877</td>
</tr>
<tr>
<td>3. State Farm</td>
<td>70,983</td>
<td>148,999</td>
</tr>
<tr>
<td>4. GEICO</td>
<td>111,078</td>
<td>102,565</td>
</tr>
<tr>
<td>5. Travelers</td>
<td>68,924</td>
<td>94,498</td>
</tr>
<tr>
<td>Total Voluntary and AIP</td>
<td>$1,659,048</td>
<td>$2,422,125</td>
</tr>
<tr>
<td><strong>PENNSYLVANIA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New York AIP</td>
<td>$29,089</td>
<td>$133,505</td>
</tr>
<tr>
<td>1981 Ranking—Voluntary Business Only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. State Farm</td>
<td>$119,092</td>
<td>$274,916</td>
</tr>
<tr>
<td>2. Nationwide</td>
<td>102,393</td>
<td>224,878</td>
</tr>
<tr>
<td>3. Allstate</td>
<td>74,335</td>
<td>178,866</td>
</tr>
<tr>
<td>4. Erie</td>
<td>56,974</td>
<td>153,931</td>
</tr>
<tr>
<td>5. Aetna</td>
<td>51,665</td>
<td>88,159</td>
</tr>
<tr>
<td>Total Voluntary and AIP</td>
<td>$1,011,834</td>
<td>$1,845,623</td>
</tr>
</tbody>
</table>

*Source: Best's Competitive Reports. Total Automobile minus AIP and AIPSO Insurance Facts.

Note: Exposure curves were not readily available. Some caution should be used in terms of market penetration based on premium volume since premium will reflect distribution bias. Varying rate level and rate level changes among companies also will affect premium distribution.
<table>
<thead>
<tr>
<th>Insurer Share</th>
<th>1975–1981 Percent Change in Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.J. AIP</td>
<td>29.9%</td>
</tr>
<tr>
<td>Allstate</td>
<td>(2.7)</td>
</tr>
<tr>
<td>State Farm</td>
<td>1.1</td>
</tr>
<tr>
<td>N.J. Manufacturers</td>
<td>(0.2)</td>
</tr>
<tr>
<td>Liberty Mutual</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Prucac</td>
<td>3.3</td>
</tr>
</tbody>
</table>

**NEW YORK**

<table>
<thead>
<tr>
<th>Insurer Share</th>
<th>1975–1981 Percent Change in Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>N.Y. AIP</td>
<td>13.9%</td>
</tr>
<tr>
<td>Allstate</td>
<td>1.0</td>
</tr>
<tr>
<td>Aetna</td>
<td>0.1</td>
</tr>
<tr>
<td>State Farm</td>
<td>1.9</td>
</tr>
<tr>
<td>GEICO</td>
<td>(2.5)</td>
</tr>
<tr>
<td>Travelers</td>
<td>(0.2)</td>
</tr>
</tbody>
</table>

**PENNSYLVANIA**

<table>
<thead>
<tr>
<th>Insurer Share</th>
<th>1975–1981 Percent Change in Market</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pa. AIP</td>
<td>3.8%</td>
</tr>
<tr>
<td>State Farm</td>
<td>3.1</td>
</tr>
<tr>
<td>Nationwide</td>
<td>2.1</td>
</tr>
<tr>
<td>Allstate</td>
<td>2.3</td>
</tr>
<tr>
<td>Erie</td>
<td>2.5</td>
</tr>
<tr>
<td>Aetna</td>
<td>(0.3)</td>
</tr>
</tbody>
</table>

*Source: Premium comparisons from Table 7.

personal automobile business to more efficient, lower priced competitors. Other beneficiaries are those drivers most likely to be responsible for future accidents. Those adversely affected by suppres-
tion at residual market rates by government are the large majority of insurance consumers who are forced to pay premium amounts unrelated to their future loss potential and who are denied the benefits of vigorous competition for their business. Insurers of private passenger automobiles also may be adversely affected to the extent that residual market losses are not offset by other income and to the extent that management control of rating and underwriting is eliminated.

As a result of charges of unfairly discriminatory rating and underwriting practices by insurance companies, a growing number of states are adopting rate regulatory practices that result in the residual market mechanism becoming the strongest competitor in the marketplace for a significant number of risks. Artificial suppression of residual market rates should be viewed as the creation by state government of residual market mechanisms which are in direct competition with private insurers, using financing provided by private insurers. At stake in this competition is the ability to make management decisions with regard to rating and underwriting and, ultimately, the ability to operate the automobile insurance business on a sound fiscal basis with adequate reserves and relatively stable premiums-to-surplus ratios.
Anti-Competitive Effects of Pooling Private Passenger Auto Insurance

Judith Mintel*

Abstract

The various forms of residual market mechanisms for private passenger automobile insurance are described, including assigned risk plans, joint underwriting associations, reinsurance facilities, and state funds. The author discusses the theoretical bases underlying each, concluding that pooling, i.e., pooling of income, losses, and expenses, is anti-competitive because it fails to reward efficient insurers and also tends to reduce the financing necessary for long-term stability in the auto insurance market.

Pooling of private passenger automobile insurance is used in only a few jurisdictions in the United States, primarily in the residual market area. A small number of states have also created pools for portions of some auto insurance coverages on voluntarily written risks such as unlimited medical coverage (Michigan Catastrophic Claims Association, New Jersey Unsatisfied Claim and Judgment Fund) and the difference between two optional tort thresholds (New Jersey Auto Insurance Risk Exchange). "Pooling" of automobile insurance, as used in this paper, refers not to the distribution of risks or applicants as is done in the typical auto insurance assigned risk plan, but to the pooling of income, losses, and expenses associated with the

* Counsel, State Farm Insurance Companies, Bloomington, Ill. Formerly she was Virginia Deputy Insurance Commissioner.
insurance and the distribution of net profits or losses to those insurance company participants in the pooling mechanism.

Legislative consideration of proposals to create auto insurance pools have usually arisen in those areas of the auto insurance market where the cost of providing coverage is perceived to be significantly greater than the amount of income that can be generated practically or politically. A few auto insurance companies have supported legislation creating auto insurance pools, but most have consistently opposed pooling. Pooling of auto insurance whether in the residual market or in coverages written voluntarily reduces competition tending to increase overall costs. Pooling can also promote maintaining the status quo in market shares because it equalizes costs without regard to efficiency, and it creates disincentives for auto insurers to compete by developing efficiencies in operation or in pricing differences. In some states, the recognized standards for the financing of the auto insurance business to assure solvency and stability have been affected adversely as pooling has developed. Depending on the degree of reduced financing and the size of the auto insurance pool, this situation can raise questions concerning the long-term financial stability of the auto insurance market.

Residual Market Risks

There are a few applicants for automobile insurance who are considered uninsurable by private companies, including the chronic traffic offender who has lost his driver’s license. But the percentage of drivers who fall into this category is fewer than five percent of the licensed drivers in any state. However, there are additional factors not inherent in a particular risk that can cause a risk to be unacceptable to a private company providing automobile insurance. These factors are the capacity of the company receiving an application for auto insurance and the adequacy of the company’s voluntary rate level for the losses and expenses associated with that policy. The capacity of an insurance company refers to its financial capacity; that is, the amount of capital and policyholder surplus available to support additional business. It

may also refer to the ability of the company to provide service to additional policyholders given limitations of personnel, data processing equipment, and other service facilities. Inadequate voluntary rate levels for a particular category of risk may be caused by government rate regulation or by competitive pressures. Capacity limits and pricing may also result in a marketing emphasis by an individual company that tends to exclude voluntary acceptance of certain types of classes or risks.

The rate that is adequate to prevent categorizing a risk as a residual market risk varies from company to company depending upon two major factors: The first factor is the company's efficiency; that is, the amount of expenses associated with servicing that policy and the ability of the company to settle claims quickly, fairly, and without payment of fraudulent claims. The second factor is the accurate pricing of each individual risk insured. One company's ability to be profitable at an overall rate level that is below that of many of its competitors does not necessarily mean that it insures a disproportionate share of those who are not involved in automobile accidents. Instead, it may mean that the lower-rated company is more accurate in the pricing of each individual risk that it insures and that it has lower expense and loss payments because of careful management.

Accurate pricing involves both appropriate base rates and rate relativities among the various rate classifications and territories. It also includes the gathering of sufficient information by the agent and underwriter to classify properly the risk insured. The insurance company that emphasizes accuracy in pricing gains a significant competitive advantage over one that does not; and, in fact, will necessarily have a "better" book of business than its less accurate competitor. This principle can best be illustrated as follows: Assume that two companies start with identical base rates for an adult driver who uses the insured vehicle for pleasure driving ($100). However, the rate relativities of the two companies vary as follows:

<table>
<thead>
<tr>
<th>Class</th>
<th>Rate Relativities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1: Adult, Pleasure Use</td>
<td>Company A: 1.00, Company B: 1.00</td>
</tr>
<tr>
<td>Class 2: Adult, Commute to Work</td>
<td>Company A: 1.05, Company B: 1.20</td>
</tr>
<tr>
<td>Class 3: Youthful Operator, Pleasure Use</td>
<td>Company A: 3.00, Company B: 2.50</td>
</tr>
</tbody>
</table>
Assume also that the relativities of Company A more accurately reflect the increased loss exposure associated with commuting to work and pleasure use by a youthful operator. Because of the operation of the competitive market, Company A is likely to insure more adult commuters or class 2 business and Company B is likely to insure more vehicles with youthful operators or class 3 business. This is true because of the way consumers react to the pricing policies of the two companies not because of discriminatory practices by either company.

After a period of operations, assume that the risk distribution for each of the companies is the following:

<table>
<thead>
<tr>
<th></th>
<th>Company A Risk Distribution</th>
<th>Company B Risk Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Class 2</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>Class 3</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Because of the assumption that Company A’s relativities are correct, Company A now insures no “bad” or, more accurately, no unprofitable risks. However, Company B insures 40 risks at inadequate rates. After any experience period, Company A is likely to be more profitable than Company B. Especially is this so if Company B fails to obtain the necessary underwriting information and continues to classify improperly several vehicles that have youthful operators so that these operators pay premiums at the lower adult rate. To obtain the proper level of profitability Company B has a choice. It can either adjust its rate relativities and correct any misclassified policies, or it can increase its base rate for class 1 policies to generate the additional income, thus increasing rates for all policies proportionately. If it chooses the latter course, its competitive and profitability problems are compounded. The other alternative is to reject all class 3 drivers. Thus, the pricing inefficiency of Company B can result in its refusal to write certain risks voluntarily for reasons unrelated to the driving abilities of the individuals insured. The competitive advantage inherent in accurate pricing is illustrated below by the indicated rate needs of Companies A and B assuming the rate relativities and risk distributions set forth above.
An applicant for auto insurance might also choose to purchase coverage through a residual market mechanism, even though the applicant would otherwise be insured by a private insurance company voluntarily. These factors include, among others, a favorable price, agent selection preferences, and convenience. Because consumer choice and inadequate pricing or capacity are much more influential than inherent driving skill in determining whether an applicant is insured voluntarily, it is an error to conclude that those insured through the residual market are "bad drivers."  

Residual Market Mechanisms: The Auto Insurance Plan (AIP)

An assigned risk plan is the most common method for insuring vehicles whose drivers cannot purchase coverage from a private insurance company voluntarily. In such a plan, auto insurance applicants are assigned on a random basis to private insurers in proportion to the voluntary market share insured by each company. Rates for policies issued through the plan are uniform for all companies. Rates are usually based on the loss experience of the plan. In 1973, state legislatures began to experiment with alternative residual market mechanisms for private passenger automobile insurance. Currently 10 states have adopted alternative mechanisms leaving 40 states and the District of Columbia with an assigned risk plan, generally classed the Automobile Insurance Plan (or "AIP").

2. Joint underwriting associations have been established in Florida, Hawaii, Missouri, and Michigan, and a syndicate or state fund has been created in Maryland. Effective in 1984 the New Jersey Legislature created a nonprofit, nonstock association to provide auto insurance through servicing carriers. Massachusetts changed the form of its alternative mechanism to a hybrid form of reinsurance facility using servicing carriers in 1984. Reinsurance facilities are also in operation in New Hampshire, North Carolina, and South Carolina.
The one feature common to all of the alternative mechanisms is that, to a greater or lesser extent, they remove incentives to keep losses and expenses at the lowest possible level by preventing a private insurer from deriving any benefit from its own internal efficiency in handling residual market business.

In an assigned risk plan, the same compulsion imposed by competition in the voluntary market to price business accurately, keep expenses low, and settle losses efficiently is present. Because each private insurer is apportioned risks or applicants rather than a share of the losses, its individual experience is primarily affected by the efficiency of its own operation. If one company prices risks, issues policies, provides service, and handles claims better than another company, it will receive the benefit of lower residual market losses than its less efficient competitor. These lower residual market losses can be used to magnify the more efficient company's competitive advantage in the voluntary market. A competitive advantage in the voluntary market usually results in increasing market share. Because assignments are based on a company's voluntary market share, the companies who are the most effective competitors will ultimately service the largest portion of residual market business when an AIP is in effect.

The alternatives to an AIP that have been adopted in various states are one of two major types. All involve a mechanism for pooling losses rather than allocating risks. The first is an underwriting association composed of all insurers providing coverage through a limited number of servicing carriers or a syndicate providing coverage directly through its own employees with financial backing by all insurers. The second is a reinsurance facility coupled with a statutory compulsion for every insurer to accept all applicants.

**Joint Underwriting Associations, Syndicates, and the New Jersey Automobile Full Insurance Underwriting Association**

Alternative residual market mechanisms in Florida, Hawaii, Missouri, and Michigan are examples of the pooling device popularly referred to as a joint underwriting association or JUA. New Jersey
and Massachusetts have residual markets that have most of the characteristics of a JUA but with significant modifications. In a JUA pooling alternative, the statute compels all insurers licensed to sell auto insurance to become members of a nonprofit association. The association contracts with a limited number of auto insurers who agree to be servicing carriers in exchange for a fee. All agents licensed to write auto insurance either select or are assigned to one of the servicing carriers. An agent may place any applicant with his or her servicing carrier, and insurance will be provided by the association through the servicing carrier. Rates are uniform among all servicing carriers and are based on either association experience or some other criteria. Losses of the association are apportioned to all association members except in New Jersey where the Plan of Operation provides that members are not responsible for the obligations of the Underwriting Association. Apportionment of JUA losses is usually done on the basis of each member’s share of the voluntary market. In some states, losses of the auto insurance pool are collected from all auto policyholders prior to or simultaneously with the obligation to pay the association. In other instances a loss recoupment process is contemplated.

Maryland calls its auto insurance residual market mechanism a state fund. The state provides coverage directly but requires some limited financial backing by insurers. In Rhode Island, the service center concept now in use is conjunction with the AIP is a hybrid syndicate and assignment mechanism. It provides coverage directly though it is not considered a part of government. The Rhode Island Service Center has employees who both issue policies on behalf of member companies and also handle all policy services, though individual companies continue to be responsible for claims services for their assigned customers. The major characteristics of a syndicate or state fund are identical to those set forth for the JUA pooling mechanism using servicing carriers, except that this type of mechanism hires its own staff rather than contracting with insurers to be servicing carriers.

Reinsurance Facilities

The alternative residual market mechanisms in New Hampshire, South Carolina, North Carolina, and prior to 1984, in Massachusetts
are examples of reinsurance facilities. The statute compels all insurers licensed to write private passenger automobile insurance to accept and service all applicants who request insurance from the company through its agents. Once it issues an auto policy, a private insurer may decide either to retain the risk as a part of its voluntary business or to cede or reinsure the risk to the reinsurance facility if it believes that the risk is inadequately priced or if the insurer lacks the financial capacity to handle all risks that apply. When a company decides to cede a risk to the facility, the premium income, the losses, and sometimes, the expenses associated with that risk are pooled with all other risks ceded to the reinsurance facility. In addition, each private insurer is required by statute to assume a portion of the net losses generated by the reinsurance facility. Each insurer’s portion of the losses may be based on its percentage of voluntary market business in the state, the percentage of business it ceded to the facility, or a combination of the two.

The rate level for those insured involuntarily—that is, ceded to the facility—varies because the applicable rate is the individual company’s voluntary rate. As a result, when a reinsurance facility is present there is a regulatory tendency to try to force voluntary rate uniformity, usually by encouraging adherence to bureau rates. Even when voluntary rates are not uniform, state governments attempt to eliminate a separate identifiable rate level for the residual market. In actual practice the effectiveness of this requirement has been undermined in various degrees. For example, in South Carolina there are “designated carriers” with a higher than average rate level that write a significant portion of the business that is reinsured through the South Carolina Reinsurance Facility. Also, in North Carolina recoupment surcharges applicable only to residual market business result in a price differential between voluntary and reinsurance facility business even though these surcharges have been judicially construed not to be a part of the rate and downward deviations from bureau rates are not applied to reinsured business.

The anti-competitive effects of pooling through a reinsurance facility residual market mechanism are the most extreme. The following example illustrates these anti-competitive effects: Assume there are three companies, Company A, B, and C, each writing

100,000 auto insurance risks. Assume also that each writes 90,000 risks with a loss cost of $100 and 10,000 risks with a loss cost of $200. Company A has administrative expenses of $60 per risk; Company B, $50 per risk; and Company C, $40 per risk. Without a pooling mechanism Company A would need to charge $170 per risk ($110 average loss cost plus $60 expenses) to break even on its underwriting operations. Company B would be required to charge $160 and Company C would charge $150.

A reinsurance facility is now introduced into the market and, for competitive reasons, each company charges $150 per risk. What happens? The direct experience before reinsurance is:

<table>
<thead>
<tr>
<th>Company</th>
<th>Premium</th>
<th>Losses</th>
<th>Expenses</th>
<th>Underwriting Profit &amp; Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>15,000,000</td>
<td>11,000,000</td>
<td>6,000,000</td>
<td>-2,000,000</td>
</tr>
<tr>
<td>B</td>
<td>15,000,000</td>
<td>11,000,000</td>
<td>5,000,000</td>
<td>-1,000,000</td>
</tr>
<tr>
<td>C</td>
<td>15,000,000</td>
<td>11,000,000</td>
<td>4,000,000</td>
<td>0</td>
</tr>
</tbody>
</table>

Because its rate is adequate, Company C may choose not to cede any of its business to the reinsurance facility. Company B is likely to cede part of its business. Company A is likely to cede as much as possible. Assume the following ceded experience for the three companies. Company A cedes 10,000 risks with a loss cost of $200 and 40,000 of its risks with a loss cost of $100 at a net premium of $90 (150 minus 60) per risk; Company B cedes 10,000 risks with a loss cost of $200 at a net premium of $100 (150 minus 50) per risk:

<table>
<thead>
<tr>
<th>Company</th>
<th>Net Premium</th>
<th>Losses</th>
<th>Profit or Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4,500,000</td>
<td>6,000,000</td>
<td>-1,500,000</td>
</tr>
<tr>
<td>B</td>
<td>1,000,000</td>
<td>2,000,000</td>
<td>-1,000,000</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The net loss of $2,500,000 will not be allocated to companies based on total market share (i.e., one third to each) resulting in the following net results.
### Perceived Need for Pooling

Those who criticize the operation of assigned risk plans and advocate change to pools have used three basic arguments: (1) regardless of cost, social equality and fair treatment for each individual driver must be achieved as well as equality and fair treatment of each individual insurance company, an assigned risk plan is “unfair” to both some drivers and some companies; (2) the losses of the assigned risk plan are too high for some insurance companies to absorb; any change is an opportunity to improve that loss situation, and (3) pooling reduces fraud and improves efficiency because of the one-on-one relationship required between a producer and a single company.

### I. Concerns about “Equal” Treatment

Some who criticize the concept of an assigned risk plan have argued that each individual should have a right to choose the insurer with which he or she will do business and that the selected company must accept that individual or face charges of unfair discrimination. This argument stems from the conclusion that purchase of automobile insurance is either compelled by the state or by a lienholder and access to that which is required must be guaranteed as a “right.” Failure of a particular company voluntarily to insure an applicant, however, is not analogous to the denial of service at a lunch counter for reasons of race as some have alleged. Capacity limitations and

<table>
<thead>
<tr>
<th>Company</th>
<th>Direct Profit or Loss</th>
<th>Ceded Profit or Loss</th>
<th>Assumed Profit or Loss</th>
<th>Net Profit or Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-2,000,000</td>
<td>-1,500,000</td>
<td>-833,333</td>
<td>-1,333,333</td>
</tr>
<tr>
<td>B</td>
<td>-1,000,000</td>
<td>-1,000,000</td>
<td>-833,333</td>
<td>-833,333</td>
</tr>
<tr>
<td>C</td>
<td>0</td>
<td>0</td>
<td>-833,333</td>
<td>-833,333</td>
</tr>
</tbody>
</table>

Both Company A and Company B benefit at the expense of Company C as a result of the pooling. It is clear that there is little incentive for an insurer to improve its efficiency or, as a similar example would illustrate, its pricing accuracy in such an environment.
consumer choice are often involved. The AIP does guarantee the availability of auto insurance from a private company to each li-
censed driver who pays the premium due. Service is provided by the agent of the driver's choice. The argument that a "stigma" attaches to those insured through the assigned risk plan, that they are some-
how "second class citizens," seems to be closely related to the ar-
gument that denial of coverage is based on social prejudice rather
than economic compulsion and constitutes unfair discrimination. In
fact, studies have shown that residual market populations are rep-
resentative of the driving population as a whole. No one race, na-
tionality, location, or sex is overrepresented in the typical AIP.

The issue of unfair discrimination in company underwriting de-
cisions is most often tied to political notions of the affordability of
automobile insurance. Usually a proposal for pooling is well received
when these carry a political perception that rates in the AIP are either
unaffordable or that they would be unaffordable if standard
rating procedures were applied. Because AIP rates are usually at least
50 percent higher than rates available from private companies vol-
untarily, and because the reasons why a particular individual sub-
mits an application to the AIP cannot always be objectively deter-
mined, it is easy to criticize as unfair the fact that a particular
individual is subjected to the higher AIP rate.

A refinement of this criticism is that AIP rates for those with
bad driving records might be justifiably higher, but not for the so-
called "clean" risks, that is those with three years of accident, vi-
olation-free driving experience. There is however, no statistical or fac-
tual basis for arguing that voluntary and residual market rate levels
should be similar. In fact, actuarial indications of assigned risk plan
rates are consistently significantly higher than those in the voluntar-
ary market. Also, "clean" risks in the assigned risk plan produce
losses significantly higher than the losses of those drivers in the as-
signed risk plan that are not "clean." The process of underwriting
selection, therefore, does on the whole, isolate an assigned risk pop-
pulation producing significantly higher losses in relation to the pre-
mium than the population that is voluntarily insured.

More important, the cost of losses generated by motorists in-
sured through the residual market must be paid by someone. Arga-

ments that those insured through the residual market should not pay rates based on residual market loss experience fail to come to grips with the fundamental question, which is whether those insured voluntarily should pay for losses caused by others. Also, the change in form from a risk distribution system to a pooling mechanism does nothing to change the indicated rate differential between the voluntary and residual market, nor does it change company underwrit

Complaints about lack of coverage options and inadequate service to customers in the AIP do have some historical validity. In recent years, however, service and coverage options available in almost all AIPs compare favorably with that available in the voluntary market. Because service provided in the voluntary market varies substantially among companies, most AIPs have developed standards for all companies in the handling of AIP policies. These standards cover such matters as the minimum time to issue a policy, pricing accuracy, and complaint handling. In most states, a parallel effort has resulted in producer standards in such activities as handling funds and timeliness in forwarding applications. In addition, variations in the quality of service provided are not materially affected by a change in form of the residual market mechanism since all alternative forms, other than a state fund, involve service by several insurers.

The argument that an assigned risk plan treats some insurance companies unfairly is based on objections to the "lack of the draw" inherent in the assigned risk procedures and a belief by some companies, usually those with smaller market shares, that the assignments they receive represent an unfair allocation of large losses vis-à-vis their competitors. The objection to assigned risk plans or the basis of "fairness" to individual companies also arises out of a desire by some to avoid the service obligations of the plan that require additional personnel and facilities rather than a more simple financial commitment.

II. Residual Market Losses

While arguments dealing with affordability, improved service, free choice of company, and "equal" treatment of driver and insurer are usually made when an alternative residual market mechanism is
being advocated, usually the one critical issue at the core of the debate is the competitive position of various companies that participate in the automobile insurance market in the state. Often, consideration of an alternative residual market mechanism is initiated by insurance companies who are losing market share because they charge higher than average rates or suffer from large financial losses or both.

The possible beneficial effects of an alternative residual market mechanism to these companies are twofold. First, they can reduce their worst losses by requiring financial contributions from their more efficient competitors through pooling. Ultimately, these financial transfers from the more efficient to the less efficient will tend to promote uniformity in rates, thus reducing competition and preserving the status quo in market share. This goal can be achieved by political control over the loss distribution formula that is required as a part of participation in the pool. Thus, some companies can reduce their worst losses at the expense of their competitors through political power rather than market discipline. This method of reducing losses is not possible in a risk distribution system.

Second, pooling of losses enhances the ability of higher cost, inefficient firms to service larger portions of the market. This is so both in a JUA where a high cost firm can become a servicing carrier or in a reinsurance facility where a high cost firm can write a high volume of business at competitive rates and code its inadequately priced business to the facility.

Where an assigned risk plan is in effect, this advantage for an inefficient firm is not possible because the ability of a firm to service residual market business is directly related to its ability to compete for business. A company that has a high expense ratio, tolerates inaccurate pricing and class slippage to a significant extent and permits claim settlement practices that result in higher than average loss costs is likely to suffer reducing market share. Where there is an assigned risk plan, the loss in market share will be equal across the total market. When an alternative residual market mechanism is in effect, however, there is a greater opportunity for a higher cost firm to increase its residual market business as its voluntary market share declines. Also, through the residual market loss allocation procedures, it can obtain financial contribution for its continued operation from its more efficient competitors and rate differentials throughout
the auto insurance market are reduced, a factor that also tends to help maintain the status quo in market shares.

III. Improved Efficiency in Company-Agent Relations

It has also been argued that the random assignment feature of AIPs (which precludes a one-on-one relationship between an agent or broker and a single company) results in inefficiency and created opportunity for fraud. In all alternative residual market mechanisms, each agent represents only one company for the writing of residual market business. It may be true that a company can be more efficient when dealing with a more limited number of agents. It may be that the increased supervision by an insurance company of agents specifically assigned to it may reduce fraud. But these benefits must be weighed against the lack of incentive for accurate pricing, efficient service and claims handling, and the destruction of competitive forces that are inherent in alternative residual market mechanisms.

Financing of Auto Insurance Pools

Under an assigned risk plan or risk distribution system, an auto insurance company must issue a policy directly to the applicant assigned to it and must individually assume the risk associated with that policy without contribution from other competitors. If a pooling device is substituted, it is no longer the financial responsibility of each company to service only the business assigned to it. Rather each company is required to assume some portion of the net industrywide financial loss. This allows a company to treat pooled business differently from directly insured business in ratemaking, in accounting of losses, in investing of premiums, and in capitalization requirements.

1. Ratemaking, Loss Accounting, and Investment Practices Used in Pools

Pooling can result in changes in ratemaking, accounting, and investment philosophy that will generate significantly less income to
insurers than is otherwise considered reasonable. The primary stress of change are in basing rates on criteria other than anticipated resid-
ual market costs, in recouping losses on a uniform basis retroactively rather than through prospective ratemaking, and in basing liability accounts on other than incurred losses and expenses. While a change in ratemaking and accounting is also possible in assigned risk plans (and has been effected in a small number of states), deviations from standard procedure is much more likely after a pool has been created.

For example, of the 10 auto insurance residual market pools in op-
eration, eight use nonstandard ratemaking techniques.5

One ratemaking approach that is used in conjunction with auto insurance pools is to suppress pool rates artificially by requiring sim-
ilarity to rates available in the voluntary market. For example, in Michigan, residual rates are based on an average of rates charged by the top 10 writers in the state. In New Jersey, residual market rates must be identical to rates in effect for Insurance Services Office (ISO) the largest voluntary market rate filer. Reinsurance facilities attempt to prohibit rate differentials between the voluntary and residual mar-
kets as an essential statutory provision. These inadequate rate levels make the pool a major competitor in the auto insurance market, causing growth of the pool and generating larger and larger losses which must be funded somehow. This funding is typically accom-
plished by assessing auto insurance companies that operate in the voluntary market for the losses. The companies, in turn, must at-
tempt to collect additional premium from all auto insurance poli-
cyholders in both the voluntary and residual markets to recoup these assessments.

When the losses generated by inadequate rates for pooled busi-
ness become large enough to cause significant rate increases for non-
pooled business, political pressure develops to prevent these in-
creases. In the past, some states by regulation have prohibited prospective ratemaking and substituted loss recoupment procedures. This change seemingly reduced the risk of loss by transforming ins-
urers into providers of financial services at a theoretically guaran-
teed rate of return. But, in fact, the procedure reduces premium in-
come by excluding from consideration in the ratemaking process

5. States using nonstandard ratemaking techniques for residual market pools include Massachusetts, Michigan, North Carolina, South Carolina, Hawaii, New Jer-
sey, New Hampshire, and Maryland.
positive trends in frequency, severity, and growth. To the extent that
recovery amounts must be uniform among all companies, rating
uniformity is increased and competition correspondingly reduced.
The other regulatory device that has been used in some states to
forestall rate increases attributable to pooled business is to base es-
timates of pool income needs on short-term cash needs or paid losses
and expenses rather than on the traditional criteria of incurred losses
and expenses.

The result is large and growing unfunded liabilities which may
not be accounted for uniformly by all companies subject to assess-
ment for these losses. Lastly, in those auto insurance pools that re-
quire creation of a separate fund, the potential exists for less pro-
ductive investment of premium that would be the case with
nonpooled premium.

2. Capitalization Considerations

To avoid solvency problems, the traditional rule of thumb in the
insurance industry is that an insurer should avoid expansion beyond
the point where its net written premiums (net after cessions to re-
insurance) for any year exceeds twice its net worth (policyholder
surplus). Where there is an assigned risk plan, written premiums in
the residual market are capitalized in a manner similar to voluntary
written premiums and are included in any calculation of a company's
premium to surplus ratio. Where there is pooling, this is not always
the case. For example, when capitalization requirements are ana-
lyzed in the traditional way, all the premium attributable to business
ceded to a reinsurance facility is not considered. Also, the New Jersey
Automobile Full Insurance Underwriting Association insures more
than one million vehicles and collects approximately $640 million
in premiums annually with no capital or surplus. To the extent that
an alternative residual market mechanism adopts ratemaking, ac-
counting, and investment procedures that reduce the financing nec-
essary for long-term stability in the auto insurance market, these
pools also reduce the desirability of competing in the market in that
state.

6. I. KENNEY, FUNDAMENTALS OF FIRE AND CASUALTY STRENGTH
[1949].
Introduction


The pricing of personal automobile insurance is the most common task for casualty actuaries, because of the large volume in this line of insurance and because of the keen competition among the major carriers. In past years, the actuary’s role was to examine past experience, extrapolate trends in claim frequency and severity, forecast future loss costs, and set appropriate premium rates for the coming policy year.

No longer is this sufficient. The frequency of vehicular accidents remains steady—yet automobile claim costs spiral upwards. Public frustration over “unaffordable” premiums cascades into citizen propositions to scale back insurance rates. The difficulty of pinpointing the causes of higher costs, however, make this misdirected anger so hard to relieve.

Four remarkable studies from the Journal of Insurance Regulation, performed jointly by the Automobile Insurers Bureau of Massachusetts and Correlation Research, Inc., painstakingly quantify
the causes of the rising costs: shifts toward sprain/strain injuries, extended treatment by chiropractors along with pervasive attorney involvement, and apparent “build-up” of economic damages to exceed statutory tort thresholds. The studies show how insurers may identify the questionable claims, and they suggest reforms to mitigate insurance costs. But the studies are careful not to raise our expectations, the problems caused by unethical attorneys and medical practitioners seem almost insurmountable.

Perhaps the most important lesson for the actuaries from these studies is the perspective from which to view automobile bodily injury loss costs. Let us begin with a “naive” view of accidents, which presumes that accidents are purely random effects. Liability is assigned by negligence law, and the tortfeasor must compensate the victim for his or her injuries. These perspectives move us to a more realistic view.

The Underwriting Perspective. Underwriters have said these accidents are not purely random effects. Rather, there are various factors that influence the likelihood of accidents, and they should be used in the underwriting decisions or in setting premium rates. These factors are the dimensions of the classification plans used in personal automobile insurance:

- Driver attributes, such as age, sex, and marital status.
- Vehicle and vehicle use attributes, such as “sports-car” or “horsepower” and “drive to work” vs. “pleasure use.”
- Location attributes, such as the territory where the vehicle is garaged.

Many of these are proxy variables. For instance, young, unmarried male drivers have far higher accident frequency rates, on average, than middle-aged, married, male drivers have. In life insurance, the physiological characteristics of the policyholder’s sex affect his or her expected mortality. That is, there is an intrinsic connection between sex and mortality rates. But few persons presume that there is an inherent connection between sex and automobile accident frequency rates. Rather, the age and sex of the driver is presumably correlated with other characteristics, such as maturity or carefreeness, that are associated with accident frequency rates.
The Claims Perspective. The physical damages caused by the accident are not equivalent to the damages sought in the insurance claim. Two individuals might suffer the same back sprain in automobile accidents: one shrugs it off, and the other sees a chiropractor fifty times. Various factors influence the ultimate loss costs, such as:

- The type of injury, such as back sprain vs. bone fracture,
- The liability of the drivers,
- Whether or not the insurance claim is represented by an attorney,
- The type of medical practitioner providing treatment, such as MD vs. chiropractor vs. physical therapist, and
- The “claims consciousness” of the accident victim (for which territory—e.g., rural vs. urban—is often a proxy).

The Compensation System. Thirty years ago, automobile accident compensation was governed by the same tort liability system in all U.S. jurisdictions. The inefficiencies of the tort liability system, however, stimulated the development of a variety of no-fault compensation and “add-on” compensation systems in about half the jurisdictions. The systems differ in various ways:

- Whether no-fault benefits replace tort benefits or are an addition to tort benefits,
- The compensation limits for each no-fault benefit (e.g., wage loss and medical),
- The type of no-fault threshold (verbal vs. monetary),
- The criteria of a verbal threshold and the dollar amount of a monetary threshold, and
- The administration of the no-fault system.

The structure of the no-fault system may have unexpected effects. For instance, a $1,000 no-fault threshold means that the accident victim can not sue in tort for his or her damages unless medical costs of the accident exceed $1,000. One might presume that this restriction on suits would reduce bodily injury loss costs. However,
the opposite is equally possible. The monetary threshold may serve as an incentive, encouraging accident victims to incur $1,000 or more in medical bills, so that they may file a bodily injury claim. Since general damages, or damages for "pain and suffering," are often implicitly set as a multiple of medical losses, higher medical bills translate into higher pain and suffering awards and into higher bodily injury loss costs.

The expected loss costs must be estimated from the convergence of these three perspectives. The combination of [i] drive and vehicle characteristics, [ii] injury, claimant, and medical/legal practitioner characteristics, and [iii] compensation system characteristics influence the proper pricing of automobile insurance policies. The four studies published in the Journal of Insurance Regulation, two of which are reprinted in this anthology, show how these perspectives should be handled, with emphasis on the second viewpoint, i.e. "injury, claimant, and medical/legal practitioner characteristics."

In no-fault jurisdictions with low monetary no-fault thresholds and with attorneys handling the vast majority of automobile insurance claims, claims are often "built-up." In other words, accident victims will incur unneeded medical treatment to raise the incurred costs above the no-fault threshold and allow the filing of a bodily injury claim. Until 1989, Massachusetts had a $500 monetary threshold, and nearly 90 percent of claims were represented by an attorney. Here was fertile ground for the build-up of claims.

But how might an insurer identify built-up claims, or even outright fraudulent claims? Weisberg and Derrig, in "Fraud and Automobile Insurance," delineate the characteristics of suspicious claims. The type of injury and treatment, such as "soft-tissue" injuries, excessive chiropractic care, and a prolonged recovery, were often deemed by claims examiners as signs of possible build-up. Certain law firms and health-care providers were so commonly associated with suspicious claims that their involvement in a case roused suspicions of fraud. Irregularities in the accident description, however, such as a lack of witnesses or of a police report, rarely signified fraud to the claims examiner.

Build-up is easiest for soft-tissue injuries, such as strains and sprains, and for treatment by chiropractors and physical therapists. Casualty actuaries have traditionally examined pre-accident factors, such as driver characteristics, vehicle characteristics, and the location where the vehicle is garaged. Marter and Weisberg, in "Medical
Costs and Automobile Insurance," examined 597 Massachusetts Bodily Injury claims from 1985 and 1986. They looked at post-accident claim and claimant characteristics: the type of injury (sprain/strain, fracture, laceration, concussion, or more severe injury), the health care provider (medical doctor, chiropractor, or physical therapist), and the course of treatment (emergency room, hospital stay, or outpatient visits). They found that 60 percent of claims were for sprains and strains, for which outpatient treatment, split about equally between medical doctors and chiropractors, formed the predominant medical cost.

What characterizes built-up and fraudulent claims? Weisberg and Derrig provide a set of 18 characteristics that might be associated with such claims, five of which were indeed effective predictors of "apparent build-up."

Ideally, we would like to compare claims from two regions: one region where many or most claims were built-up and the other region with more legitimate claims. Accordingly, all the IRB studies perform a separate analysis of claims from Lawrence, the "insurance fraud capital" of Massachusetts. Marter and Weisberg find that the Lawrence claims were predominantly sprains and strains, treated by chiropractors, with unusually little variance in the length of treatment or the claim medical charges. "How ironic," say the authors, that those claims are "distinguished by their atypically high proportion of 'typical' claims."

One consolation remains for the optimistic insurer: since the median medical cost of a Bodily Injury claim was $1,264 ($1,168 for sprains/strains), the 1985 increase of the Massachusetts no-fault tort threshold to $2,000 of medical expenses should eliminate the minor "soft tissue" cases.

Not so, show the follow-up studies by Weisberg and Derrig, "Preliminary Evaluation of Massachusetts Automobile Bodily Injury Tort Reform" and by Marter and Weisberg, "Medical Expenses and the Massachusetts Automobile Tort Reform Law." [To conserve space, these latter two studies are not included in this anthology.]

1. It is almost impossible to prove that a claim was actually built up to meet a statutory no-fault threshold or to establish a better claim for "pain and suffering" damages. After all, maybe the medical care or the chiropractic care was indeed useful, or at least desired primarily for health benefits. Thus, Marter, Weisberg, and Derrig are always careful to speak of "apparent build-up," or a suspicion of fraud, not definitive build-up or fraud.
interested readers can find them in Volume 10 of the Journal of 
Insurance Regulation." Soft-tissue" cases have increased over three 
quarters of post-reform claims involve a strain or strain, with a me-
dian medical cost of $2,729. Chiropractors treated 56 percent of the 
strains and strains, with an average of 34 outpatient visits a claim-
ant. The primary result of the Tort Reform Law was not the elimi-
nation of minor claims. Rather, claimants filed increasingly for 
strains and strains (rather than lacerations or fractures), and they 
visited chiropractors enough times to exceed the tort threshold.

Signs of apparent "build-up" were even more apparent in the 
Lawrence claims, predominantly strains and strains, treated by 
"high-claim-frequency" chiropractors, and represented by "high 
claim-frequency" attorneys. "As Weisberg and Derrig suggest in their 
IRR article, "a small group of health care providers (primarily chiro-
practors) and attorneys working together may be at the heart of the 
Lawrence situation."

The course of treatment was unusual in its 
uniformity; almost all claims had about 34 visits to a chiroprac-
tor, and only 2 were admitted to a hospital.

Casualty actuaries are called upon to estimate the likely effects 
of compensation system reforms. After all, they have priced auto-
mobile insurance policy costs in various jurisdictions, they should 
have the expertise to price a system reform. But actuaries who have 
focused only on the underwriting perspective may have a "naive" 
view. Indeed, Weisberg and Derrig show how wide of the mark was 
the "naive" view of the effects of the 1989 Massachusetts reform. 
Monetary tort thresholds, such as the $2,000 Massachusetts variety, 
often serve as goals, not deterrents. Strong verbal thresholds are 
needed to eliminate minor injuries and contain costs. But reforms 
that do not affect incentives do not succeed. In Massachusetts, the 
authors comment, "attorneys, health care professionals, and acci-
dent victims have every incentive to maximize the dollars expended 
on diagnosis and treatment of injuries." They suggest instead three 
remedies: medical care cost containment, timely scrutiny of mili-
dical charges, and stronger law enforcement for fraudulent claims. 
The actuarial profession should aid this effort, by further examining the 
relationships between claim characteristics, compensation systems, 
and premium rates.

One final note: The authors admit that: "it may be difficult under 
the current tort system in Massachusetts to achieve a substantial 
reduction in losses attributable to suspicious claims."

Inser com-
panies evidently agree. Of the 52 Lawrence claims in the 1989 study, 50 were on policies that had been ceded to the involuntary pool.

Medical Costs and Automobile Insurance

A Report on Bodily Injury Liability Claims in Massachusetts

Sarah S. Marter*
Hebert I. Weisberg**

Abstract

This report summarizes the data on injuries and associated medical costs collected as part of the Automobile Insurers Bureau ("AIB")

[Editors Note: The report that follows has been edited primarily to reflect the journal's editorial style; the only exception has been to omit the Executive Summary.]

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** President, CORELATION RESEARCH, INC., Needham, Mass.
Baseline Study of Bodily Injury Liability Claims in Massachusetts. The analysis was based on a representative sample of 597 bodily injury claims resulting from accidents occurring during the period July 1, 1985, through June 30, 1986. The major emphasis is on outpatient care, which accounted for 42 per cent of the total claimed charges. The results illustrate the type of information potentially available from a clinically focused review of claims. The authors suggest guidelines for identifying "typical claims and several possible management indicators for monitoring claims. An overview report on the Baseline Study that describes the research methodology, presents a broader profile of BI claims and analyzes the nature and extent of fraudulent claims will appear in the June issue of the Journal.

**Introduction**

The relationship between the cost of medical care and the cost of automobile insurance is not well understood. Most policymakers are probably unaware that incurred medical care charges and lost wages constitute only a base level of special damages, or economic losses, from which total settlement amounts are derived. Total payments include general damages, or payments for pain and suffering, which are usually greater than the special damages. In addition, policymakers may not know that premiums for bodily injury coverages are tied to rapidly increasing medical costs rather than to the general rate of economic inflation. In the last 10 years, charges for medical care have increased by about 150 per cent, while the Consumer Price Index as a whole has risen only 55 per cent (Figure 1).

According to the recent All-Industry Research Advisory Council ("AIRAC") report on automobile injuries nationwide, "Medical expenses accounted for nearly 70 per cent of the economic losses for claims other than fatality and permanent total disability claims." Moreover, the AIRAC study concluded that bodily injury liability claimants collected an average of $211 for every $100 dollars of economic loss reported. In light of this leveraging of economic losses and the rapid escalation of medical care costs, it is clear that within the constraints of the tort system, it is necessary to manage the ap

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1. **ALL-INDUSTRY RESEARCH ADVISORY COUNCIL, COMPENSATION FOR AUTO-MOBILE INJURIES IN THE UNITED STATES 6 (1989).**
propriateness and cost of medical care to maintain premiums at acceptable levels.

Developing policies for cost containment should be based upon an understanding of the treatment of injuries that result from automobile accidents and the costs associated with this treatment. The database compiled for the AIB BaselII Study of Bodily Injury Liability Claims in Massachusetts represents a unique resource that can provide some of the necessary information.

Understanding the nature of claimed medical charges can be a useful precursor to potential cost containment initiatives in two principal ways. First, we may begin to develop a qualitative perspective on what constitutes "reasonable and necessary" medical treatment, so that guidelines for appropriate costs may ultimately be developed. By examining the statistical distribution of claims, we can determine criteria for defining unusual treatment patterns that may be worthy of further scrutiny. For readers unaccustomed to the

2. Although successfully used for health insurance claims for more than 10 years, this approach has not found widespread application to casualty insurance, at least not on an industry-wide basis.
use of statistical terms, a glossary is included at the end of this report.

Second, our Baseline Study can provide norms against which subsequent data can be compared. For example, it has been speculated that the 1989 increase in the tort threshold may actually be an invitation for increased build-up of medical charges, rather than a deterrent to marginal or suspicious claims. A sharp increase in the relative proportion of "atypical" claims in comparison to the baseline levels would support this hypothesis.

To examine patterns of treatment in a meaningful way, we must relate the treatment to the injuries incurred. Our first step, therefore, was to group injuries into four manageable, homogeneous injury categories.

Using these simplified injury categories, we then analyzed treatment patterns in terms of:

- Total medical charges
- Outpatient medical charges
- Outpatient medical providers
- Outpatient visit frequency
- Time pattern of treatment

Although the Baseline Study sample comprised 597 claims that resulted from accidents occurring between July, 1985, and June, 1986, the current study includes only 429 of these claims. Claims were eliminated from the sample if they involved only a PIP [Personal Injury Protection or No-Fault] subrogation (125 claims), if the study claimant died as a result of injuries incurred in the accident (10 claims), or if the claim file yielded insufficient information about the injury (35 claims). Of the 429 remaining claims, 48 involved study claimants who gave a Lawrence address as their residence. As in our initial study, because Lawrence claims were characterized by extremely high levels of fraud and build-up of medical costs we decided to analyze the "Lawrence claims" separately. The main body of this report is based on the more typical injuries of residents of the remainder of Massachusetts.

3. Among many other changes, Chapter 373 of the Massachusetts Acts of 1988 revised the fixed dollar tort threshold from $500 to $2,000.
Categorization of Injuries

The data collection instrument used in the Baseline Study allowed for the recording of up to three distinct injuries by the initial medical contact and/or the primary health care provider. For each specific injury, the location (e.g. neck, limbs) and type (e.g. strain/sprain, fracture) were obtained. Consequently, there could be a great deal of complex information characterizing the injuries for which treatment was given.

As a first step in reducing this data to a manageable form, we examined the frequencies in our total sample of all combinations of injury type and location. *Table 1 shows the 13 meaningful injury/location combinations which occur and their frequencies. Note that the numbers in the table add to more than the 429 claims in our sample, since a particular individual may contribute as many as five injuries. These results show clearly the overwhelming preponderance of neck and back strains, followed by lacerations and contusions of either the head or limbs. Limb fractures and concussions, while much less frequent in our sample of Massachusetts claims, are also prevalent.

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<table>
<thead>
<tr>
<th>Type of Injury</th>
<th>Location of Injury</th>
<th>Head</th>
<th>Neck</th>
<th>Back</th>
<th>Limbs</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strain/Sprain</td>
<td></td>
<td>231</td>
<td>191</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laceration/Contusion</td>
<td></td>
<td>88</td>
<td>3</td>
<td>10</td>
<td>93</td>
<td></td>
</tr>
<tr>
<td>Fracture</td>
<td></td>
<td>14</td>
<td>3</td>
<td>5</td>
<td>54</td>
<td>13</td>
</tr>
<tr>
<td>Concussion</td>
<td></td>
<td>32</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. For this purpose we chose not to exclude claims, since our goal was exploratory. Also, internal injuries were set aside for special treatment because they all occurred by definition in the "internal" location, and it was decided to group them with other serious injuries.
If each claimant had only one of the 13 injury/occasion combinations shown in Table 1 or an internal injury it would be relatively simple to study the treatment patterns associated with each injury. Unfortunately, most claimants presented two or more such combinations and the number of possible patterns of such combinations is enormous. Therefore our task was to amalgamate such patterns into a small number of relatively homogeneous groupings.

In performing the process of amalgamation, our guiding principle was to group patterns on the basis of the particular injury that was most likely to account for the majority of treatment expense. For example, a study claimant incurring a concussion and neck strain was grouped into the "strain/sprain" category because the neck strain seemed likely to drive the cost of treatment to a much greater degree than the concussion.

The aggregation process moved through several stages as we reduced the number of categories. Ultimately, we opted for a typology which divided nearly all the injuries into four groups, each of which was characterized by a general type of injury which tended to dominate the treatment expense pattern. For simplicity, we have named these groups in accordance with the "dominant injury" type:

1) Strains/sprains
2) Fractures
3) Lacerations/contusions
4) More serious injuries

It should be understood, however, that the claims in each of these categories are somewhat diverse and may include a large number of specific injury patterns. What they share in common is substantial similarity in terms of the major determinants of treatment costs and patterns. In the remainder of this section we define the four categories in some detail.

The strains and sprains category includes claimants whose injuries were:

• Strains/sprains only
• Strains/sprains with lacerations/contusions

5. The data available on 10 claims (2.6%) of our sample proved insufficient to classify them into one of the groups.
Strains/sprains with concussion
Strains/sprains with lacerations/contusions and a concussion

Treatment for strains/sprains tends to be characterized by relatively low charges on the day of the accident followed by extended outpatient treatment. Our preliminary analyses indicated clearly that when the only other injury in conjunction with strain/sprain was a concussion or laceration, the outpatient treatment for strains/sprains usually accounted for the great majority of medical provider visits and cost. Thus, we decided that claimants who had lacerations/contusions or concussions as well as their strains/sprains should be included with the strains/sprains.

The fractures category includes claimants whose injuries were:
- A fracture of the limb, back, neck, or head (single location)
- A fracture in one location with lacerations/contusions
- A fracture in one location with strains/sprains
- A fracture in one location with strains/sprains and lacerations/contusions

Claimants with fractures of more than one body location were deemed seriously injured and were included in Category 4, as were claimants with fractures and concussions. When lacerations/contusions or strains/sprains occur in conjunction with a fracture, they generally entail much less expense, although notable exceptions can occur. For example, a laceration can result in plastic surgery, or a serious back strain can entail extended chiropractic treatment. However, such situations are relatively infrequent and would appear in our data as outliers.

The lacerations/contusions category includes:
- Lacerations and/or contusions only
- Lacerations/contusions and concussions

This category is intended to capture the relatively minor injuries which tend to be treated primarily on the day of the accident and ordinarily require little follow-up outpatient intervention.

The more serious injuries include:
- Fractures of more than one body part
- Fractures with concussions
• Internal injuries alone
• Internal injuries with another injury

This category is the least homogeneous, but can be expected to involve only injuries with high medical expenses. Relatively little of the treatment for these injuries occurs on an outpatient basis.

Table 2 shows the number and percentage of claimants in each injury category. Sixty per cent of the non-Lawrence claimants are included in the strains/sprains category, while only 12 per cent are in the lacerations/contusions category. Sixteen per cent of the claimants were included in the fractures group, and 9 per cent of the claimants had more serious injuries. These percentages of injuries are comparable to those reported by AIRAC in 1989. For all no-fault states 59 per cent of claimants sustained neck strains or sprains and 56 per cent claimed back strains or sprains.

Before going on to the analysis of treatment patterns, it is worthwhile comparing the typology developed here with that used in the overview report on the Baseline Study of Bodily Injury Claims. The previous categorization, motivated largely by the focus on apparent build-up and fraud, divided claims into three types:

• Strains/sprains only
• Mixed (Strains/sprains and non-strains/sprains)
• Non-strains/sprains

The percentage of apparent build-up, in particular, was highest for the strains/sprains only [50 per cent], followed by the mixed [34

<table>
<thead>
<tr>
<th>Injury Category</th>
<th># of Claimants</th>
<th>Percentage of All Claimants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strains/Sprains</td>
<td>230</td>
<td>60%</td>
</tr>
<tr>
<td>Fractures</td>
<td>60</td>
<td>16%</td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>46</td>
<td>12%</td>
</tr>
<tr>
<td>More Serious Injuries</td>
<td>35</td>
<td>9%</td>
</tr>
<tr>
<td>Unclassifiable Injuries</td>
<td>10</td>
<td>3%</td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>381</td>
<td>100%</td>
</tr>
</tbody>
</table>
per cent) and the non-strain/sprain (9 per cent). Figure 2 shows the percentage of claims judged to exhibit apparent build-up in each of our four categories. Not surprisingly, the highest percentage by far is for claims in which strains/sprains are the dominant injury (43 per cent). For the other three categories, the percentage is roughly constant.

**Treatment of Injuries**

In this section we consider patterns of treatment for claims overall and in relation to the injury categories discussed above. Recall that the results given are based on the 581 non-Lawrence claims in our sample. It should be pointed out that the charges recorded in our database reflect all medical treatment reported to the insurer, regardless of whether and by whom these charges were actually paid.

**FIGURE 2**

Build-up Claims by Injury Category

<table>
<thead>
<tr>
<th>Injury Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strains/Sprains</td>
<td>43%</td>
</tr>
<tr>
<td>Fractures</td>
<td>17%</td>
</tr>
<tr>
<td>Lacer./Contus.</td>
<td>11%</td>
</tr>
<tr>
<td>More Serious Inj.</td>
<td>14%</td>
</tr>
</tbody>
</table>

Source: AIB Baseline Study
Thus we will sometimes refer to these charges as "claimed" charges. Note also that all amounts specified represent actual dollar amounts without inflation adjustment. We address the implications of economic inflation later in this report.

**Total Claimed Medical Charges**

As shown in Figure 3, the largest proportion of medical charges was attributable to strains/sprains (38 per cent). The lowest proportion (6 per cent) was claimed for lacerations/contusions. Fractures accounted for 26 per cent of the total claimed medical expenses, while the more serious injuries accounted for 27 per cent. The distributions of charges for claims within each of the categories is summarized in Table 3. Overall, the median was $1,264 and the average $2,804. For claims overall, as for each of the four injury categories, the distribution of charges was highly skewed. A relatively small number of extremely large values influenced the average, which was therefore

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6. The collection of health care providers’ bills and the accompanying medical reports constitute a valuable source of detailed information on the complete medical treatment for injuries resulting from motor vehicle accidents.
<table>
<thead>
<tr>
<th>Injury Category</th>
<th>Median</th>
<th>50th Percentile</th>
<th>95th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strain/Sprain</td>
<td>1,106</td>
<td>4,250</td>
<td>12,900</td>
</tr>
<tr>
<td>Fractures</td>
<td>1,716</td>
<td>4,673</td>
<td>18,577</td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>898</td>
<td>3,839</td>
<td>15,988</td>
</tr>
<tr>
<td>More Serious Injuries</td>
<td>4,398</td>
<td>6,899</td>
<td>20,979</td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>1,294</td>
<td>2,594</td>
<td>11,118</td>
</tr>
</tbody>
</table>

*Quartile values. An outlier was defined as a value more than three standard deviations above the mean.
substantially higher than the median, or central value. In such a situation, the median is probably more representative of a "typical" claim value. As expected, the lacerations/contusions group had the lowest median charge of $808, and the more serious injuries group the highest median charge of $4,388. The median charge for strains/sprains was $1,168.

Approximately 48 per cent of the total medical charges was for hospital based care. Of this hospital care, 7 per cent was for emergency care and 41 per cent was for inpatient care. Forty-two per cent of the total medical charges was for outpatient care. Some of this outpatient care was rendered in hospital outpatient clinics. Our outpatient data include care rendered in both offices and clinics. Ten per cent of the total charges was for other medical expenses such as medical equipment, rehabilitation or replacement services, and diagnostic procedures.

**Outpatient Medical Charges**

Table 4 shows the outpatient medical charges by injury category and overall. On average, $1,141 was claimed for outpatient medical charges out of the average total medical charges of $2,854.7

The highest median outpatient charge ($870) was for strains/sprains, while the lowest median charge ($216) was for lacerations/contusions. The main charges for lacerations/contusions were incurred on the day of the accident.

**Outpatient Provider Types**

Figure 4 presents the proportion of outpatient medical charges by provider type. For all injuries combined, the highest share of outpatient medical charges was for the services of medical doctors (38 per cent), followed by chiropractors (26 per cent). Physical therapist services accounted for 16 per cent. The remaining 20 per cent was shared among osteopaths, dentists, psychotherapists, hospital-based professionals, and other providers.8

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7. Outpatient charges do not include charges incurred on the day of the accident.
8. Much of the hospital-based outpatient treatment could theoretically be attributed to specific types of professionals, but we lacked the data to accomplish these designations. Since medical doctors and physical therapists are more likely to be hospital-based, their percentages may be somewhat underestimated.
### TABLE 4

Total Outpatient Medical Charges by Injury Category

<table>
<thead>
<tr>
<th>Injury Category</th>
<th>Median Charge</th>
<th>Average Charge</th>
<th>90th Percentile</th>
<th>95th Percentile</th>
<th>99th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strains/Sprains</td>
<td>870</td>
<td>1,243</td>
<td>2,725</td>
<td>3,566</td>
<td>6,256</td>
</tr>
<tr>
<td>Fractures</td>
<td>663</td>
<td>1,221</td>
<td>2,677</td>
<td>3,414</td>
<td>17,547</td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>216</td>
<td>394</td>
<td>1,001</td>
<td>1,590</td>
<td>1,974</td>
</tr>
<tr>
<td>More Serious Injuries</td>
<td>659</td>
<td>1,250</td>
<td>2,929</td>
<td>4,825</td>
<td>11,936</td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>769</td>
<td>1,141</td>
<td>2,416</td>
<td>3,474</td>
<td>7,736</td>
</tr>
</tbody>
</table>

*Outlier values
The allocation of outpatient charges among provider types varies by injury category. From Table 5 we see that for strains/sprains the largest share of outpatient medical charges (36 per cent) was for chiropractors, and physical therapists received 16 per cent. Medical doctors received the largest share for fractures (48 per cent), lacerations/concussions (62 per cent), and other serious injuries (44 per cent). The other providers include outpatient hospital charges that could not be disaggregated by provider type. Thus for fractures (41 per cent) and other serious injuries (36 per cent) the proportions to other providers are higher than expected. In these injury categories medical doctors' charges are probably underrepresented.

The outpatient charges for each injury category also vary by provider type. Table 6 shows the average and median charges for those claimants who used each type of health care provider. The median outpatient charge for a medical doctor for the strains/sprains category was $332, and the median for a physical therapist was $480. For a chiropractor the median charge was $903. These values may be misleading because claimants may receive care from more than one type of health care provider. From our data, we cannot determine...
<table>
<thead>
<tr>
<th>Injury Category</th>
<th>MD</th>
<th>Chiropractor</th>
<th>PT</th>
<th>Other Providers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strains/Sprains</td>
<td>34%</td>
<td>36%</td>
<td>19%</td>
<td>11%</td>
</tr>
<tr>
<td>Fractures</td>
<td>48%</td>
<td>8%</td>
<td>3%</td>
<td>41%</td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>62%</td>
<td>10%</td>
<td>7%</td>
<td>21%</td>
</tr>
<tr>
<td>More Serious Injuries</td>
<td>44%</td>
<td>5%</td>
<td>13%</td>
<td>36%</td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>38%</td>
<td>26%</td>
<td>16%</td>
<td>20%</td>
</tr>
<tr>
<td>Injury Category</td>
<td>MDs</td>
<td>DOs</td>
<td>PAs</td>
<td>Others</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Strains/Sprains</td>
<td>332</td>
<td>903</td>
<td>480</td>
<td>266</td>
</tr>
<tr>
<td>Fractures</td>
<td>532</td>
<td>322</td>
<td>232</td>
<td>229</td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>200</td>
<td>*</td>
<td>*</td>
<td>189</td>
</tr>
<tr>
<td>More Serious Injuries</td>
<td>472</td>
<td>*</td>
<td>*</td>
<td>355</td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>332</td>
<td>820</td>
<td>449</td>
<td>259</td>
</tr>
<tr>
<td>Injury Category</td>
<td>MDs</td>
<td>DCs</td>
<td>PTs</td>
<td>Others</td>
</tr>
<tr>
<td>-------------------------</td>
<td>-----</td>
<td>-----</td>
<td>-----</td>
<td>--------</td>
</tr>
<tr>
<td>Strains/Sprains</td>
<td>558</td>
<td>1,047</td>
<td>962</td>
<td>491</td>
</tr>
<tr>
<td>Fractures</td>
<td>685</td>
<td>650</td>
<td>410</td>
<td>1,071</td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>324</td>
<td>*</td>
<td>*</td>
<td>233</td>
</tr>
<tr>
<td>More Serious Injuries</td>
<td>768</td>
<td>*</td>
<td>*</td>
<td>1,216</td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>562</td>
<td>981</td>
<td>974</td>
<td>672</td>
</tr>
</tbody>
</table>

*Fewer than 5 cases
which provider directs the pattern of treatment and may be consid-
ered “responsible” for the charges. In the next section, we will dis-
cuss this issue in greater depth as we describe outpatient charges for
strains/sprains.

Outpatient Visits
As defined in the overview report the “maximum provider” is the
health care provider seen the greatest number of times. Table 7
shows summary statistics for the distributions of visits to the max-
imum provider. Using the median value as the most typical, we see
that for strains/sprains the median of 13 visits was more than four
times as high as the median value for lacerations/contusions (3). The
90th percentile shows the high number of visits at the top of the
visit distribution for each injury category. For strains/sprains the
90th percentile is 39 visits, i.e., 10 per cent of the claims in this
category entailed more than 39 visits to their maximum provider.

Outpatient Treatment for Strains/Sprains
Of the four categories of injuries we are analyzing, strains/sprains
have by far the greatest potential for fraud or build-up. These injuries
involve high utilization of medical services for a condition that is
clinically difficult to evaluate, and virtually impossible to evaluate
by the non-clinician. Moreover, as noted above, strains/sprains com-
prise about 60 per cent of our sample. We will therefore delineate in
some detail the treatment patterns for strains/sprains.

From Table 3 we observe that the average total medical cost per
strain/sprain claim was $1,759. Of this amount, $1,243 was for out-
patient treatment (71 per cent), a far higher proportion than for any
other category. Thus, it seems reasonable to focus our attention on
outpatient care. In this section we will examine the make-up of the
outpatient expenses in terms of provider type, number of visits, and
the time pattern of treatment.

Provider Type
Figure 5 shows the proportion of outpatient charges for strain/sprain
injuries by provider type. Thirty-six per cent of the total outpatient
<table>
<thead>
<tr>
<th>Injury Category</th>
<th>Median # of Visits</th>
<th>Average # of Visits</th>
<th>95th Percentile</th>
<th>99th Percentile</th>
<th>95% Percentile</th>
<th>99% Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strains/Sprains</td>
<td>13</td>
<td>18.1</td>
<td>39</td>
<td>47</td>
<td>93*</td>
<td></td>
</tr>
<tr>
<td>Fractures</td>
<td>5</td>
<td>9.9</td>
<td>22</td>
<td>53*</td>
<td>67*</td>
<td></td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>3</td>
<td>4.0</td>
<td>7</td>
<td>16*</td>
<td>19*</td>
<td></td>
</tr>
<tr>
<td>Other Serious Injuries</td>
<td>6</td>
<td>9.8</td>
<td>22</td>
<td>49*</td>
<td>57*</td>
<td></td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>9</td>
<td>14.6</td>
<td>33</td>
<td>45</td>
<td>84*</td>
<td></td>
</tr>
</tbody>
</table>

*Outlier values
charges for this injury group was for chiropractic care. Medical
doctors (34 per cent) and physical therapists (19 per cent) accounted
for most of the remainder. From Table 5 we see that the utilization
of chiropractors for strains/sprains is, as expected, much higher
than for the other categories.

The outpatient charges for strains/sprains are shown by provider
type in Table 6. As mentioned earlier, these summary statistics may
be misleading. It appears, for example, that a chiropractor’s treat-
ment for strains/sprains is more expensive than a medical doctor’s
treatment. Although the median charge is lower for a medical doctor
($332) than for a chiropractor ($903), we know that a medical doctor
may refer a patient to a physical therapist or other provider. If we
adjust for such referrals by adding the median physical therapist
charge ($480) to the median medical doctor charge, the sum ($812)
is still lower than the median chiropractor charge. As noted earlier,
the values for medical doctors and physical therapists do not prop-
erly reflect care rendered by those providers in hospital outpatient
clinics. A careful analysis of referral patterns and provider combi-

Source: AIB Baseline Study
sations will show the relative expense of treatment patterns. In the future, we would like to summarize the outpatient charges for patients who are treated by both a medical doctor and a physical therapist as well as those who see a medical doctor and a chiropractor. This analysis will also inform us of potential “doctor shopping” behavior. In addition, an indication of the claimant’s outcome or the effectiveness of the treatment is needed in order to evaluate the cost-effectiveness of care.

Number of Outpatient Visits

Table 7 shows clearly that the number of visits tends to be much higher for strains/sprains than for other injuries. Not surprisingly, we see that the substantial dollar costs are comprised of a large number of relatively small charges per visit.

Table 8 shows the distributions of visits for strains/sprains by provider types. When the chiropractor was the maximum provider for strains/sprains, the median number of visits (21) was over three times the median number made to a maximum provider who was a medical doctor (6). Physical therapists who were maximum providers typically saw their patients 13 times. For both chiropractors and physical therapists, at least 10 percent of patients experienced over 40 treatment sessions.

Table 8 also provides median and average outpatient charges for the maximum provider for strains/sprains. The median charge for a medical doctor ($420) is less than half the median charge for a chiropractor ($870). However, considering the larger numbers of visits made to a chiropractor, the charge per visit to a medical doctor is significantly higher.

Our study of 1989 bodily injury claims will address the issue of charges per visit in greater detail. Charges may be increasing due to increasing levels of service, perhaps without clinical justification. For example, it has been suggested that diagnostic testing is increasing. To investigate this idea further, we will be collecting data on the use of diagnostic procedures such as thermograms and magnetic resonance imaging ("MRI") studies.

9. The AIB and Correlation Research recently collected follow-up data on 1,500 RT liability claims for 1989 accidents, claims that would be filed under the revised $2,000 tort threshold.
TABLE 8
Use of Maximum Provider for Strains/Sprains

<table>
<thead>
<tr>
<th>Provider Type</th>
<th>Median # of visits</th>
<th>Average # of visits</th>
<th>90th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Doctor</td>
<td>6</td>
<td>9.4</td>
<td>20</td>
</tr>
<tr>
<td>Chiropractor</td>
<td>21</td>
<td>25.3</td>
<td>42</td>
</tr>
<tr>
<td>Physical Therapist</td>
<td>13</td>
<td>19.7</td>
<td>41</td>
</tr>
<tr>
<td>Overall</td>
<td>13</td>
<td>18.1</td>
<td>39</td>
</tr>
</tbody>
</table>

Outpatient Charges ($)

<table>
<thead>
<tr>
<th>Provider Type</th>
<th>Median Charge</th>
<th>Average Charge</th>
<th>90th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Doctor</td>
<td>402</td>
<td>534</td>
<td>1,190</td>
</tr>
<tr>
<td>Chiropractor</td>
<td>870</td>
<td>1,023</td>
<td>1,665</td>
</tr>
<tr>
<td>Physical Therapist</td>
<td>595</td>
<td>1,082</td>
<td>2,217</td>
</tr>
<tr>
<td>Overall</td>
<td>659</td>
<td>870</td>
<td>1,660</td>
</tr>
</tbody>
</table>

**Time Pattern of Care**

Outpatient care for strains/sprains tends to continue at a relatively high level for several weeks following the accident. In Figure 6, we show graphically how the intensity of care diminishes over a two-year period. For ease of interpretation, the values for each of the five time periods shown have been standardized to a four-week time interval (approximately one month). Table 9 presents a guide to the four-week time periods. Thus for weeks 13–52, claimants on average were still incurring charges at the rate of $40 per 4-week period, having reduced the rate from the initial average of $372 for the first 4-week period following their injuries. The graph shows the median value and the 90th percentile for the distribution of these standardized 4-week period charges. The numeric values appear in Table 10.
FIGURE 6
Outpatient Medical Charges Over Time
Strains/Sprains—1985/86

Source: AIB Baseline Study
Note: Charges are per 4 week time periods.

TABLE 9
Guide to Figures 6, 8, 9, 10, 11, and 12
Definition of 4 Week Time Periods
Outpatient Medical Charges Over Time

<table>
<thead>
<tr>
<th>Weeks From Accident Date</th>
<th># of 4 Week Time Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-4</td>
<td>1</td>
</tr>
<tr>
<td>5-8</td>
<td>1</td>
</tr>
<tr>
<td>9-12</td>
<td>1</td>
</tr>
<tr>
<td>13-52</td>
<td>10</td>
</tr>
<tr>
<td>53+</td>
<td>13</td>
</tr>
<tr>
<td>TABLE 10</td>
<td>Comparison of Outpatient Charges for Strains/Sprains* by 4 Week Time Periods—1985/86 Lawrence vs. Non-Lawrence ($)</td>
</tr>
<tr>
<td>----------</td>
<td>---------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Non-Lawrence</td>
</tr>
<tr>
<td></td>
<td>Weeks 1-4</td>
</tr>
<tr>
<td>90th %ile</td>
<td>743</td>
</tr>
<tr>
<td>Mean</td>
<td>372</td>
</tr>
<tr>
<td>Median</td>
<td>315</td>
</tr>
<tr>
<td></td>
<td>Lawrence</td>
</tr>
<tr>
<td>90th %ile</td>
<td>969</td>
</tr>
<tr>
<td>Mean</td>
<td>643</td>
</tr>
<tr>
<td>Median</td>
<td>640</td>
</tr>
</tbody>
</table>

*For use with Figures 6 and 8

Figure 6 indicates that treatment tends to diminish gradually over time, with the bulk of treatment occurring within two or three months from the accident. However, some long-term follow-up is typical. For weeks 13–20, the median level of cost corresponds to roughly one or two visits per month to a provider. The average value of $156 ($12 × 13 four-week periods) for the second year suggests a minority of claimants for whom some level of treatment continues for a very long period.

The Lawrence Claims

For claimants residing in Lawrence, 88 per cent of the total claimed medical charges was for outpatient care. This percentage is more than twice the percentage for the remainder of Massachusetts (42 per cent outpatient charges). A single hospital admission accounted
for 4 per cent of the Lawrence claimants' total claimed medical charges. As for non-Lawrence claimants, 7 per cent of the total medical charges was for care rendered in hospital emergency rooms. Two per cent of the charges were for other medical expenses such as medical equipment.

Because the Lawrence injuries were almost all in the strains/sprains category (44 of 48 injuries), this section will deal only with those injuries. We estimate that half of the claimants with strain/sprain injuries were treated in an emergency room on the day of the accident. Because outpatient treatment constitutes such a large proportion of the Lawrence claimants' medical charges and most of the injuries were strains and sprains, we concentrate only on outpatient costs and visits for this injury category in this section.

**Outpatient Medical Charges**

Table 11 presents a comparison of the summary statistics for Lawrence vs. non-Lawrence outpatient medical charges for strains/sprains. The average charge is similar ($1,243 for non-Lawrence, $1,297 for Lawrence). However the Lawrence median ($1,250) is al-

<table>
<thead>
<tr>
<th></th>
<th>Non-Lawrence</th>
<th>Lawrence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 230</td>
<td>N = 44</td>
</tr>
<tr>
<td>Average</td>
<td>1,243</td>
<td>1,297</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>1,271</td>
<td>401</td>
</tr>
<tr>
<td>Coeff. Var.</td>
<td>102</td>
<td>31</td>
</tr>
<tr>
<td>Median</td>
<td>870</td>
<td>1,250</td>
</tr>
<tr>
<td>90th %ile</td>
<td>2,725</td>
<td>1,858</td>
</tr>
</tbody>
</table>

---

10. The remaining injuries included three fractures and one laceration/concussion.
most 50 per cent higher than the corresponding median for the non-Lawrence claims ($870). The claimed outpatient medical charges for sprains/sprains in Lawrence also show surprisingly little variability in comparison to charges for strains and sprains outside of Lawrence. For example, the standard deviation and coefficient of variation are three times as high for the non-Lawrence group of claims as for the Lawrence group. These summary statistics indicate that the Lawrence strain/sprain claims are highly unusual in terms of the absence of either very high or low treatment charges. Unlike the highly variable and markedly skewed distributions typical of claims data, the Lawrence distribution reflects great homogeneity. Such homogeneity is consistent with the sort of “manufactured” claims for which suspicion has fallen on Lawrence. It is perhaps ironic (and from the insurer’s perspective frustrating) that the Lawrence claims as a group are distinguished by their typically high proportion of “typical” claims.

**Provider Type**

Figure 7 shows the proportion of outpatient medical charges for each provider type. Most of the care for the Lawrence strains/sprains was

![FIGURE 7 Lawrence Outpatient Medical Charges by Provider Type—Sprains/Sprains](chart)

Source: AIB Baseline Study
rendered by chiropractors (89 per cent of outpatient care). Medical doctors accounted for only 10 per cent of the outpatient medical charges.

A comparison of the Lawrence and non-Lawrence outpatient charges for chiropractors serving as the maximum providers is presented in Table 12. As in Table 11, we see similar average charges but higher median charges for Lawrence claimants. There is less variability in the charges on the Lawrence claims. It is noteworthy that the 90th percentile for the non-Lawrence distribution ($1,665) is close to the Lawrence value ($1,425). This similarity indicates that maximum provider chiropractors caring for non-Lawrence claimants charge about the same overall for patients requiring many treatments. Conversely, at the low end of the treatment scale the values

<table>
<thead>
<tr>
<th>TABLE 12</th>
<th>Comparison of Chiropractor as Maximum Provider</th>
<th>Visits and Charges for Strains/Sprains</th>
<th>Lawrence vs. Non-Lawrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charges ($)</td>
<td>Non-Lawrence</td>
<td>Lawrence</td>
<td></td>
</tr>
<tr>
<td>N=94</td>
<td>N=44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>1,023</td>
<td>1,149</td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>617</td>
<td>297</td>
<td></td>
</tr>
<tr>
<td>Coeff. Var.</td>
<td>60.3</td>
<td>25.9</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>879</td>
<td>1,180</td>
<td></td>
</tr>
<tr>
<td>90th %tile</td>
<td>1,665</td>
<td>1,425</td>
<td></td>
</tr>
<tr>
<td>25th %tile</td>
<td>650</td>
<td>929</td>
<td></td>
</tr>
<tr>
<td>Visits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>25.3</td>
<td>26.6</td>
<td></td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>17.3</td>
<td>8.4</td>
<td></td>
</tr>
<tr>
<td>Coeff. Var.</td>
<td>68.3</td>
<td>31.5</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>21</td>
<td>27.5</td>
<td></td>
</tr>
<tr>
<td>90th %tile</td>
<td>42</td>
<td>39</td>
<td></td>
</tr>
<tr>
<td>25th %tile</td>
<td>15</td>
<td>20.5</td>
<td></td>
</tr>
</tbody>
</table>
are significantly higher for Lawrence claimants. Outside of Lawrence, the data indicate that there are some claimants receiving relatively low levels of treatment. The 25th percentile for non-Lawrence is $650. However, for Lawrence claimants there are virtually no low levels of charges (25th percentile is $929). Lawrence claimants have a high minimum total charge from their chiropractors.

**Outpatient Visits**

The average number of visits to the chiropractor (maximum provider) was 26.6, and the median was 27.5. As indicated in Table 12, the 90th percentile was 39 visits. The Lawrence claims exhibit a pattern of visits that parallels that of outpatient charges. The median number of visits was about 51 per cent higher (27.5 vs. 21), but the average number of visits (26.6) only slightly higher than the 25.3 for non-Lawrence claims. The 90th percentile for visits was similar (42 for non-Lawrence vs. 39 for Lawrence). As for the charges, the 25th percentile for visits was 15 for non-Lawrence claimants and 20.5 for Lawrence claimants. The most striking comparison, however, reveals that for a Lawrence claimant, the minimum number of visits to a chiropractor (maximum provider) was 14 as compared to 4 visits for a claimant outside of Lawrence.

**Time Pattern of Care**

The time pattern of claimed outpatient medical charges for the Lawrence strains/sprains is shown in Figure 8 and Table 10. Treatment intensity tends to be much higher in comparison to the non-Lawrence claims during the few weeks following the accident, and nearly all treatment cost is incurred by week 12. Comparing Figure 8 with Figure 6, we see that the median charge in weeks 1–4 for the non-Lawrence group was $315, while the parallel charge for Lawrence was roughly double ($640). The Lawrence charge rates remain higher for the following two time periods. In weeks 13–52, the standardized 4-week charge values are similar ($9 for Lawrence vs. $12 for the non-Lawrence group). In Year 2, the Lawrence group incurs no more charges, while a few of the non-Lawrence claimants continue to incur charges at low levels.

The absence of cases with very lengthy treatment is another possible reflection of the artificiality of many Lawrence claims. The
typical Lawrence claimant undergoes unusually intensive treatment during the early weeks following an accident, but apparently obtains complete resolution relatively quickly. The pattern of unusually intensive early treatment followed by a precipitous drop-off in care is inconsistent with expected clinical practice.

Implications of Our Analyses

Cos: Containment Perspective

The principal implication of this study is that it is possible to track and summarize medical expenses claimed under bodily injury coverage. These findings are meaningful in highlighting areas to monitor for cost containment. The methods presented here can be used to identify atypical claims and the less obvious build-up of medical charges on otherwise typical claims. The descriptions of injuries and charges associated with medical treatment in this report serve as an
introduction to the type of information potentially obtainable from a clinically focused review of claims.

This study shows how claimed medical charges vary by type of injury and type of provider. As in the overview report, we provide a profile of the medical charges claimed in bodily injury cases. We have focused this report on outpatient care because of the preponderance of strain/sprain injuries and the availability of charge information for largely office-based care. Outpatient care constitutes 42% of the total medical charges.

In our study of 1989 bodily injury claims, we will examine in greater detail, the remaining 58% of which includes care on the day of the accident, hospital-based care including emergency room treatment and inpatient stays, and other medical expenses. A recent Boston University School of Public Health report reminds us of the high cost of hospital care in Massachusetts. From other work in the analysis of hospital-based care for health insurance, we understand the financial pressures that cost containment efforts such as utilization review place on hospitals. It is likely that hospitals are shifting costs to automobile accident victims whose care is not managed closely by payers.

In support of this idea, a recent report on workers’ compensation in Minnesota states that hospitals there offset losses in the Medicare and Medicaid programs by higher profits on workers’ compensation cases. In Massachusetts, hospitals claim that the rate-setting policy maximizes their profitability on workers’ compensation cases. This situation indicates an increased likelihood of cost shifting to non-managed cases such as automobile accident victims. Comparing the costs of motor vehicle accident injuries to the costs of other injuries would be valuable. This analysis requires appropriate indemnity health claims data. A thorough analysis of charges for emergency room services and admissions would provide important information useful for cost containment planning.


12. MINNESOTA DEPARTMENT OF LABOR AND INDUSTRY, REPORT TO THE LEGISLATURE ON HEALTH CARE COSTS AND COST CONTAINMENT IN MINNESOTA WORKERS’ COMPENSATION (March, 1993).
Specific Implications
The specific implications of this study are in two areas: guidelines for claims adjustment and management indicators for monitoring payments. The guidelines or norms for medical charges assist in identifying atypical claims on an individual basis. Additionally, the information is useful for examining claims on an aggregate basis. By designing management reports that make periodic summaries and show trends, it is possible to monitor build-up and perhaps screen for fraud.

Guidelines
The guidelines or norms for each injury category may be used to flag claims that warrant further investigation because of unusually high charges. Depending on the company’s priorities or the resources available for additional scrutiny of atypical claims, a carrier may decide to review all claims with medical charges above the 90th or more conservatively the 95th percentile for that injury category. As was indicated in the footnotes on Tables 3 and 4, the values for the 99th percentile are often outliers or values outside the expected distribution of charges. Those values are not good reference points for identifying atypical claims. Because of the high variability and skewed nature of these data, large samples are required to ensure reliable and useful 99th percentile values.

To use the guidelines or norms presented in this report, it is necessary to adjust the values for medical inflation to recent years. For this purpose, we present Tables 13 and 14. Table 13 shows the projected distribution for total medical charges by injury category for accident year 1989. These norms will be used in the Phase II AIB Bodily Injury Study of claims resulting from 1989 accidents and will be pertinent in our evaluation of the effects of the increased tort threshold. It is interesting to note that the 1989 inflation-adjusted median total medical charge for strains/sprains is $1,555. If this median value remains the typical charge, the tort threshold revision should eliminate the majority of claims for strains/sprains. The anal-

13. Economic inflation of medical charges is estimated to be 8.5% per year. See Figure 1.
<table>
<thead>
<tr>
<th>Injury Category</th>
<th>Median</th>
<th>Average</th>
<th>SD Low</th>
<th>SD High</th>
<th>Ext Low</th>
<th>Ext High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strain/Spasm</td>
<td>1,355</td>
<td>2,482</td>
<td>4,779</td>
<td>9,060</td>
<td>16,098</td>
<td>30,066</td>
</tr>
<tr>
<td>Fractures</td>
<td>2,285</td>
<td>6,222</td>
<td>18,860</td>
<td>4,737</td>
<td>39,466</td>
<td>108,966</td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>1,076</td>
<td>1,782</td>
<td>4,946</td>
<td>5,502</td>
<td>7,480</td>
<td>14,507</td>
</tr>
<tr>
<td>More Serious Injuries</td>
<td>5,726</td>
<td>11,064</td>
<td>24,722</td>
<td>27,035</td>
<td>14,507</td>
<td>27,035</td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>1,693</td>
<td>3,734</td>
<td>7,531</td>
<td>14,804</td>
<td>25,925</td>
<td>25,925</td>
</tr>
</tbody>
</table>

*Qualities values
<table>
<thead>
<tr>
<th>Injury Category</th>
<th>Median Charge</th>
<th>Average Charge</th>
<th>90th Percentile</th>
<th>95th Percentile</th>
<th>99th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strains/Sprains</td>
<td>1,831</td>
<td>2,757</td>
<td>6,667</td>
<td>6,667</td>
<td>18,952</td>
</tr>
<tr>
<td>Fractures</td>
<td>2,690</td>
<td>7,325</td>
<td>22,203</td>
<td>29,121</td>
<td>35,866</td>
</tr>
<tr>
<td>Lacerations/Contusions</td>
<td>1,267</td>
<td>2,074</td>
<td>6,689</td>
<td>9,230</td>
<td>35,866</td>
</tr>
<tr>
<td>More Serious Injuries</td>
<td>6,753</td>
<td>13,025</td>
<td>32,886</td>
<td>134,616</td>
<td></td>
</tr>
<tr>
<td>Overall - All Injuries</td>
<td>1,981</td>
<td>4,395</td>
<td>17,428</td>
<td>32,886</td>
<td></td>
</tr>
</tbody>
</table>

*Outlier values
ysis of 1989 bodily injury liability claims will show the actual statistics.

Table 14 shows the same values adjusted to 1991 dollars. This table is helpful for planning purposes for the 1991 accident year. The values in these two tables will allow us to separate the effects of inflation or price increases from other influences such as additional services due to legitimate changes in treatments or build-up of claims to reach the tort threshold. For example, an increase in the use of diagnostic testing may be symptomatic of build-up.

We have also estimated time patterns of outpatient charges for recent years. Figures 9 and 10 show the projected distributions for outpatient medical charges over time for strains/sprains for 1989 and 1991 respectively. Table 15 provides the actual values for reference. These statistics may assist claims adjusters in identifying high cost cases earlier if the medical bills are available.

Figures 11 and 12 show the same projected outpatient charge distributions for the Lawrence claims. Table 16 presents the statistics. The 1989 projected average outpatient medical charge for

FIGURE 9
Outpatient Medical Charges Over Time
Strains/Sprains—1989 (Est.)

Source: AISB Baseline Study
Note: Charges are per 4 week time periods.
strains/sprains for Lawrence claimants is $1,733. This estimate does not include charges for services given on the day of the accident. For 1991, the projected charge is $2,037. Using these estimates, the revised tort threshold alone is likely to have a less significant deterrent effect on Lawrence claimants.\(^4\)

Management Indicators

There are multiple implications for improving management indicators for claims adjustment. Certain patterns of build-up or fraud are identifiable only through examining claims in large numbers. Although we do not expect to see evidence as extreme as the Lawrence profile in other areas, some indicators may be useful. For some car-

\(^4\) Another recent development is expected to have a significant impact on fraud throughout the state. Chapter 388 of the Massachusetts Acts of 1990 authorizes formation of the Insurance Fraud Bureau of Massachusetts as a central facility for the investigation of suspicious claims.
**TABLE 15**
Inflation Adjusted Outpatient Medical Charges Over Time
Strains/Sprains
($)

<table>
<thead>
<tr>
<th>Weeks from Accident Date</th>
<th>1 - 4</th>
<th>5 - 8</th>
<th>9 - 12</th>
<th>13 - 52</th>
<th>53 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989 90th %ile</td>
<td>989</td>
<td>652</td>
<td>463</td>
<td>162</td>
<td>23</td>
</tr>
<tr>
<td>Mean</td>
<td>495</td>
<td>258</td>
<td>158</td>
<td>53</td>
<td>16</td>
</tr>
<tr>
<td>Median</td>
<td>419</td>
<td>180</td>
<td>67</td>
<td>16</td>
<td>0</td>
</tr>
<tr>
<td>1991 90th %ile</td>
<td>1165</td>
<td>768</td>
<td>546</td>
<td>191</td>
<td>27</td>
</tr>
<tr>
<td>Mean</td>
<td>583</td>
<td>304</td>
<td>187</td>
<td>63</td>
<td>19</td>
</tr>
<tr>
<td>Median</td>
<td>494</td>
<td>212</td>
<td>78</td>
<td>19</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Charges are per 4-week time periods.

It may be feasible to incorporate the following measures in their periodic management reports:

- Proportion of injury types
- Distribution of total medical charges
- Distribution of visits and charges for the maximum provider, within provider types
- Distribution of total charges for a subclass of claims suspected of fraud

We would expect that the tort threshold revision should eliminate at least some of the strain/sprain and other less serious injuries. The remaining injuries should therefore be more serious. It will be necessary to establish a new baseline level of the proportion of strain/sprain injuries based on 1989 claims. After establishing the tort reform baseline levels we must watch for an artificial increase in the severity of injuries. A significant shift toward more serious injuries may reflect an attempt to justify build-up of medical
FIGURE 11
Lawrence Outpatient Medical Charges
Over Time—Strains/Sprains—1989 [Est.]

Weeks from Accident Date
Source: AIB Baseline Study
Note: Charges are per 4 week time periods.

charges. In this baseline report, we have found that 12 per cent of
the injuries were lacerations or contusions. From the 1989 claims,
we will probably find a lower proportion of these injuries. It will
appear suspicious if the new proportion later drops dramatically and
is linked to an increase in strains/sprains. Recall that in Lawrence,
92 per cent of the injuries were strains/sprains as opposed to 60 per
cent in the remainder of Massachusetts.

The distribution of total medical charges is a valuable trend mea-
sure when monitored for specific categories of injuries and adjusted
for inflation. From analyzing the mean, median, and 90th percentile,
it is possible to document increasing costs suggestive of build-up.
When costs rise faster than medical inflation, it is likely that levels of
service are increasing.

Although the precise influence of the maximum provider on the
course of treatment requires further study, we believe that unusually
high numbers of visits or charges to a single provider merit inves-
tigation. Because treatment patterns vary by type of provider, it
would be most beneficial to monitor these claims separately within
FIGURE 12
Lawrence Outpatient Medical Charges
Over Time—Strains/Sprains—1991 (Est.)

<table>
<thead>
<tr>
<th>Weeks from Accident Date</th>
<th>$0</th>
<th>$250</th>
<th>$500</th>
<th>$750</th>
<th>$1000</th>
<th>$1250</th>
<th>$1500</th>
<th>$1750</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-4</td>
<td>5-8</td>
<td>9-12</td>
<td>13-52</td>
<td>53+</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: AIB Baseline Study  Note: Charges are per 4 week time periods.

Injury categories for specific types of health care providers. As we saw in the Lawrence data, a minimum number of 14 visits to a chiropractor is unusually high.

In the Lawrence claims, we found an unusual lack of variation in charges. As has been discussed earlier, the pervasive normalcy of claims made them appear aberrant when evaluated as a group. For selected locations or other subclasses of claims it may be useful to compare the mean and median of total medical charges. If the two values are close, the pattern of charges is atypical. When used with other indications of fraud, this measure will assist in focusing investigation efforts.

Cost Management

Given the current climate in Massachusetts, there are certain limitations on efforts to contain costs. The information contained in this report is valuable only if it is applied. It is necessary to identify incentives for automobile insurance carriers to manage medical
TABLE 16
Lawrence
Inflation Adjusted Outpatient Medical Charges Over Time
Strains/Sprains
($)  

<table>
<thead>
<tr>
<th>Weeks from Accident Date</th>
<th>1 - 4</th>
<th>5 - 8</th>
<th>9 - 12</th>
<th>13 - 52</th>
<th>53 +</th>
</tr>
</thead>
<tbody>
<tr>
<td>1989 90th %ile</td>
<td>1290</td>
<td>614</td>
<td>438</td>
<td>35</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>856</td>
<td>430</td>
<td>257</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>Median</td>
<td>852</td>
<td>453</td>
<td>246</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>1991 90th %ile</td>
<td>1519</td>
<td>723</td>
<td>516</td>
<td>41</td>
<td>0</td>
</tr>
<tr>
<td>Mean</td>
<td>1008</td>
<td>506</td>
<td>303</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Median</td>
<td>1003</td>
<td>533</td>
<td>290</td>
<td>14</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Charges are per 4-week time periods.

charges. If the incentives materialize and the regulations support cost containment, the efforts will be successful.

For example, one possible strategy for managing medical costs is to require that bills for medical services be submitted to automobile insurance carriers within 30 days of the date the services are rendered. Under the present system, despite the "no fault" payment provisions, medical bills accumulate. Often, by the time the insurance company receives any bills, the tort threshold has been reached. Requiring timely submission of bills would offer carriers an opportunity to identify high cost claims earlier. If PIP and IM carriers work together, it may be possible to achieve significant savings through this change or other initiatives.

There are numerous other possible strategies. By changing the present tort threshold based on economic losses to one based on the actual nature of the injuries, or the "verbal threshold," we could eliminate claims for strains/sprains not associated with more serious injuries.
By changing the way general damages are derived from medical charges (special damages), savings could be achieved. At present, charges for diagnostic services are weighted equally with charges for therapeutic services. With virtually no clinical guidelines for diagnostic testing, automobile insurance companies face a significant exposure. We suggest evaluating charges for diagnostic services differently from charges for therapeutic services.

Medial fee schedules and other prospective payment arrangements have been effective in slowing the rising costs for health care coverage. It is possible that an adaptation, sanctioned by the regulatory authorities, may be effective for treatments for certain types of automobile accident injuries.

Audits of selected medical bills have yielded significant savings. As discussed earlier, unusually high charges or number of visits to a single provider warrant further investigation. Charges for services unrelated to the injury can often be eliminated.

Cost containment efforts require a careful analysis of all the effects of changes proposed. The strategies suggested need to be molded to the requirements of meeting the companies' obligations to policyholders, one of which is keeping the premiums at reasonable levels.

Summary of Implications

Medical costs are rising rapidly. Because it is widely believed that medical charges leverage general damages, successful cost containment of medical charges may result in lower or fewer payments for general damages. The strategies suggested in this report for identifying atypical claims or monitoring payments are not meant to be used alone to justify denials of payments. These norms or guidelines are intended to focus the examination of other factors which may ultimately result in lower negotiated settlements or, in some cases, a denial of payment. The criteria suggested are objective, empirically defined norms. These guidelines should be used judiciously to flag claims for further study. Through the appropriate application, these methods may shift the balance toward a more equitable distribution of payments and denials of claims.
Fraud and Automobile Insurance

A Report on Bodily Injury Liability Claims in Massachusetts

Herbert I. Weisberg
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† The authors accept full responsibility for the conclusions of this report but want to acknowledge the collaboration and support of those many individuals without whom this study could not have been accomplished. Susan LaVeritte and Carol Tate of CORRELATION RESEARCH contributed to virtually all aspects of research design, data collection, and analysis. The AIB staff whose efforts were critical include Carol Ahmed, Kevin Burns, Sonya Dunbar, Cheryl Emonyak, Barbara Martell, Susan Mayhew, Jennifer Peck, and Elizabeth Peck. Jonathan Jensen managed the logistics of obtaining claim files and organizing the coding effort.

The support and cooperation of the insurance industry was manifest in several ways: The AIB Claims Committee approved the study and helped shape its direction. The 12 participating company groups spent considerable effort in reviewing the requested claim files and contributed experienced personnel to participate in the coding of files. The coders deserve special thanks. Debbie Cassidy of Hanover and Len Wall of Arrow were extremely helpful in the pre-testing phase of instrument development. Finally, we acknowledge the cooperation of the staff of the State Rating Bureau and the Attorney General's Office. Their input was particularly helpful in sharpening the research design.

[Editor's Note in original printing: Throughout the report, references are made to the numerous Appendices that accompanied the original report. The authors have covered the material contained in those Appendices to the figures that are reproduced here. Persons who have need for the voluminous Appendices, should contact Richard Derrig at 101 Arch Street, Boston, MA 02110, (617) 439-4543.]

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Abstract

This report summarizes the data on characteristics of claims collected as part of the Automobile Insurers Bureau ("AIB") Baseline Study of Bodily Injury Liability Claims in Massachusetts, with a particular focus on fraud. The analysis was based on a representative sample of 597 bodily injury claims resulting from accidents that occurred during the period July 1, 1985, through June 30, 1986. Objective data were obtained on the accident, the claimant, the claim, the injury, and the medical treatments; judgmental data were collected on suspicious aspects of the claim. This report sharpens the distinction between build-up and outright fraud and provides preliminary estimates of their prevalence. A special analysis of data from one particular city, widely believed to contain a large fraud operation, helped to refine a profile of suspicious claims.

Introduction

Background

On March 29 and 30, 1989, representatives from the claims handling operations of nine insurance companies participated in a "focus group" sponsored by the Automobile Insurers Bureau of Massachusetts ("AIB"). The purpose of the focus group was to elicit expert perceptions of suspicious and fraudulent bodily injury ("BI") liability claims and the problems posed by such claims, and to suggest potentially fruitful avenues of research. The focus group activities included a pilot review, using a preliminary draft instrument, of 80 files corresponding to claims considered highly suspicious.

This pilot review and accompanying discussions led to a list of possible "fraud indicators" and some sense of their relative frequency, at least for our non-random sample. The major problem with these fraud indicators was their dependence on subjective judgments. For example, while there was broad consensus that extensive medical treatment for relatively minor injuries was questionable, no objective standards for excessive treatment were proposed.1

Another finding from the focus group was the unanimous perception that not only was "build-up" of medical expenses the most prevalent and costly problem that confronted insurers, it was the most difficult kind of abuse to substantiate. Moreover, there was a general conviction that recently implemented reforms would certainly affect the specific patterns of build-up and might even exacerbate the problem.

These results underlined the need for research to improve our understanding of the nature of BI liability claims and how they are currently handled. Such research would represent an important first step toward quantifying fraud in meaningful terms, monitoring of trends, fashioning of effective counter-measures, and evaluating the effectiveness of industry efforts to combat fraud.

Our research design was guided by several insights provided by the focus group participants. First, we learned that any definition used to classify claims as "fraudulent" would be artificial and subjective. Claims that involve clear-cut misrepresentations of fact may be far outnumbered by those that fall in the "gray area" of suspected exaggeration by the claimant or health care provider about the injury or damages. Moreover, the evidence contained in the claim file can be derived from several sources and be subject to varying degrees of uncertainty.

Second, we became aware that the claims adjustment process is much more complex than a simple decision to pay or deny a claim based on some easily codified rules. Developing a meaningful data collection instrument required an appreciation of the gradations of evidence available to the adjuster, the options for compromising the claimant's demands within the dynamic process of settlement negotiation, and the various strategies that can be adopted by the claimant's attorney. Failure to capture such complexities would lead to an over-simplified and distorted picture of the way BI liability claims are handled.

Third, we realized that it would be impossible to study BI claims and their handling on a current basis. Because of the very lengthy loss-development process which typifies BI liability claims, the information available on recent claims is extremely limited. In partic-

2. Effective in 1989, the mandatory tort threshold in Massachusetts was changed from $500 to $2,000 and the basic No-Fault Personal Injury Protection ("NFP") limit changed from $2,000 to $8,000.
ular, claims in which some element of fraud is suspected may be more likely to involve protracted litigation.

In light of these complexities, we concluded that it was premature to address at this time the ultimate goals of quantifying the amount of fraud and developing guidelines for detecting and controlling fraud. Achieving these goals will require a long-term research commitment. We determined that the current study should lay the groundwork for such an effort by clarifying the nature of BI liability claims and the particular aspects of them that engender suspicion. Accordingly, we set the following objectives for the current study:

1) Develop a profile of BI liability claims and their handling in terms of both objective characteristics and judgmental assessment.

2) Estimate the extent of various specific factors possibly related to fraud.

3) Investigate possible relationships between objective characteristics of claims and expert assessments of their suspiciousness.

4) Examine the statistical distributions of special and general damages in relation to characteristics of the accident and injury.

Data Collection Instruments

Discussions during the focus group convinced us that the coding of claim files should be performed by experienced claims adjusters. It was the group's consensus that only experienced adjusters would possess the requisite technical knowledge to assure reliable and valid data. Starting with the preliminary instrument used in the pilot review, we designed a set of instruments to capture both objective and subjective assessments of the information contained in the files. The process of refining the draft coding forms included two rounds of pre-testing and culminated in development of two forms.

Form 1 was intended to abstract verifiable data about the accident, the injury, medical treatment, medical expenses, and the in-

3. Forms 1 and 2 are included in Appendix A to the original report.
investigation and disposition of the claim. Information about the accident was recorded from the insured driver, the study claimant, witnesses, and the police. Information about the injury and treatment was derived from the statements of various health care professionals as well as the study claimant. To document any inconsistencies systematically, we recorded the versions provided by all available sources as reflected within the file. According to the focus group participants, certain types of inconsistencies in the information provided by different sources can form a basis for suspicion.

Form 1 places particular emphasis on the patterns of treatments and associated costs for each health care provider. Costs are broken down into five standardized time-periods subsequent to the accident. By this detailed breakdown, we can explore the build-up phenomenon and begin to develop norms against which claims can be compared to assess the reasonableness of treatment in an objective fashion.

Form 2 provides a judgmental assessment by the coders of factors that bear generally on the validity of the claim. These factors include the insured driver’s degree of fault, suspected elements of fraud, types of inflated demands, and specific factors that influence the assessment of fraud. The characteristics that define a fraudulent claim in Form 2 are more specific than the general statements contained in the regulatory definition. In addition to the data coded from the claim files, we also extracted some basic claim and underwriting information directly from the AIB Statistical Plan data base. These items were entered directly into the study data base.

**Sampling of Claim Files**

We limited our study to BI liability coverages, primarily because these represent a large proportion of all bodily injury claims and secondarily to simplify the data collection process. Because of the low

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4. Massachusetts Regulation (211 CMR 93.03) defines fraudulent claims as “claims submitted with the intent of receiving a larger payment from the insurer than the amount, if any, to which the claimant is entitled under the policy, including claims for (i) non-essential losses, (ii) amounts in excess of actual losses, or (iii) incidents which the claimant has arranged in an effort to receive an insurance payment.”

5. Overall, AIB Statistical Plan data indicate that for the 1985 and 1986 accident years combined, these coverages accounted for approximately 63% of claims and 48% of losses (as of Dec. 31, 1985) attributable to bodily injuries. Claims for bodily injuries may also be filled on a first party basis under PIP, medical payments and uninsured motorist coverages.
coverage limits for PIP claims before 1989 and the absence of general
damages, the potential for fraud in pure no-fault situations is much
more limited. To accommodate scenarios peculiar to uninsured or
underinsured motorists would have complicated the study consid-
erably. Moreover, since the number of such claims relative to BI li-
ability claims is small, it would have been necessary to increase the
total study size substantially to obtain a sufficient number of claims
from these coverages.

The study covers BI liability claims that arise from accidents that
occurred between July 1, 1985, and June 30, 1986. This time-period
was chosen to assure that most of the claims would be closed by the
time of coding. It should be noted that the tort threshold during this
period was $500. Since the threshold was increased to $2,000 at the
beginning of 1989, we would not expect the study sample to be rep-
resentative of current claims in all respects.
The sample of claim files was drawn from 10 of the larger com-
pany groups that together currently comprise over 70 per cent of the
Massachusetts automobile insurance market. Restriction to 10 com-
pany groups was primarily for practical considerations, since we felt
that it would be unwieldy to manage files and coders from a larger
number of company groups. Particular company groups were chosen
primarily on the regulatory definition of representativeness [211
CMR 93.03]. We recognized that the elimination of small company
groups could in theory affect our ability to generalize results to the
entire population of BI liability claims. However, since the aim of
this baseline effort was to disclose general patterns rather than to
produce precise quantification, we did not consider this limitation
to be critical.
The sampling unit for our study was an individual BI liability
claim rather than an accident. We focused on claimants rather than
on accidents, because many of the characteristics of interest vary
different claims which happen to emanate from the same ac-
cident. The total number of claims selected for retrieval was 803,
allocated in proportion to each company group's actual share of total

6 Most of the companies consolidate all documents pertaining to BI liability
claims that arise from a single accident into a single file. As a consequence, in a small
number of cases it proved impossible to identify unambiguously the individual claim-
ent corresponding to a sampled claim number. In such cases, we selected one claim at
random to be the study claimant.
claims during the relevant time-period. Claim numbers were selected randomly from among all the claims reported under the Commissioner's Statistical Plan as of Dec. 31, 1988. We estimated that some of the files would be impossible to retrieve, and some of those retrieved would correspond to reserves set up in anticipation of claims which never actually materialized. We expected the actual number of usable files to be approximately 500, comprising approximately one per cent of the total claim population. 

A more detailed description of the selection procedure can be found in Appendix B of the original report.

The actual number of coded files resulting from our sample was 597. There were only 59 files (7.3 per cent) that could not be retrieved and 147 (18.3 per cent) that were screened out because no claim had materialized. The number of files screened out was somewhat lower than anticipated, in part because a replacement file was selected whenever possible. That is, if the claim file included information on another individual who actually filed a BI liability claim against the same policy, that claimant was included. If two or more such claimants existed, one of them was chosen at random. Consequently, the actual sample comprised roughly 1.2 per cent of the total BI liability claim population. The table in Appendix C of the original report compares the distribution of coded files across company groups against the theoretical distribution of claim files based on their proportional representation in the Statistical Plan data base. The distributions appear quite similar. Thus, no systematic distortion of the sample was caused by missing and screened out files.

Data Collection Process

Experienced claims adjusters, most of whom now hold supervisory positions in their respective companies, were recruited from the 10 company groups that participated in the study. To avoid problems arising from possible lack of familiarity with the format or organization of the claim files, each adjuster coded only files from her/his company group.7

7. The number of coders from each company group ranged from one to four, depending on the number of files to be reviewed. Each coder reviewed up to 60 files in total during a two-week period. Coders were given extensive training immediately before beginning actual coding. Training sessions lasted for more than a full day and included a general introduction to the project, familiarization with the coding forms.
After the coding of every claim file, the set of forms was reviewed to catch and correct any apparent errors or omissions. A trained reviewer from AIB or CRI ran through a checklist of possible problems. Data quality was further enhanced during data entry by incorporating data edit checks into the entry screens and complete key punch verification (double-entry) for all numeric items. Data entry was performed at the AIB. When questions arose during either coding or data entry, they were brought to the attention of the reviewer and/or CRI staff. Although some questions were idiosyncratic, others raised general issues not addressed adequately in the training or instructions. These situations required an overall decision by CRI, which was documented and disseminated.8

Statistical Analysis

In an attempt to produce useful information quickly, these preliminary analyses were restricted to relatively simple tabulations. We believe that the most important implications of our data can be highlighted with descriptive statistics. However, there may be a role in the future for more sophisticated multivariate modeling.

Although the total sample consisted of 597 files that corresponded to bodily injury claims by a single claimant, for purposes of analysis it seemed reasonable to impose two restrictions on the sample. First, we knew that some of the BI liability claims consisted entirely of a PIP subrogation payment. Such claims are not really a subject of concern in the context of potentially suspicious claims, because the relatively low limits and absence of general damages in PIP coverage effectively eliminate the incentive for fraudulent claims. Based on the information collected, we determined that 123 of the 597 were "PIP subrog only" claims, leaving 474 "true" BI liability claims.9

8. The final version of the Manual of Instructions, incorporating all such decisions, can be found in Appendix D attached to the original report.
9. PIP subrogation accounted for 4.9% of the total dollars paid for the 597 claims in our sample. Claims involving only PIP subrogation accounted for 1.1%. Note that for claims that remained open as of the date of coding (8.2%), paid dollar amounts included the most recent reserve.
Second, we had prior evidence that claims from the City of Lawrence tended to be unusual in a way that warranted special treatment. In a previous study of automobile insurance data, we discovered a pattern of claims against Lawrence policyholders that was difficult to explain by any mechanism other than widespread fraud. Although the policyholder may be implicated in BI fraud, the claimant is more likely to be directly involved. In the current study, we had the advantage of being able to obtain each claimant’s address. Thus, we could examine in detail the claims made by individuals who were Lawrence residents at the time of the accident.

Our initial analyses confirmed that during the study period Lawrence residents were heavily over-represented in the study sample and that the Lawrence claims exhibited a highly unusual pattern of characteristics. We therefore excluded from the main analyses the 48 Lawrence claims among the 474, leaving a total of 426 for our main analytic sample. Although the total sample, including the Lawrence claims, would have been more representative of Massachusetts claims as they actually were, we believe that their inclusion would have distorted the profile of “typical” BI liability claims.

Of course, the Lawrence claims themselves are of considerable interest. First, to the extent that the Lawrence situation in fact exemplifies a general type of “fraud epidemic” that might occur in other places, an understanding of its dynamics would be useful. Second, specific information developed by our study may be helpful to law enforcement authorities who are investigating the ongoing Lawrence situation. General information on the 48 Lawrence claims is presented in a separate section.10

Profile of Bodily Injury Liability Claims

Characteristics of Claims

The objective information abstracted from the files regarding the nature of the claim can be divided into five general categories:


11. Specific information will be communicated directly to appropriate authorities.
• The Accident
• The Claimant
• The Claim
• The Injury
• The Treatment

We highlight the most important findings in this section.¹² For some characteristics, we are able to make comparisons with the recently completed study of Compensation for Automobile Injuries in the United States produced by the All Industry Research Advisory Council ("AIRAC"). However, note that the AIRAC sample differs from this study in certain important respects. The AIRAC sample of 3,354 liability claims included claims that were closed during a two-week period in 1987. The study was nationwide, although some very limited results on the 392 Massachusetts claims can be culled from it. Thus, the results given, even when restricted to "no-fault" states like Massachusetts, reflect a mix of different statutes that govern liability claims. Criteria for exclusion of potential claims that failed to materialize or claims that involved only PIP subrogation are not specified in the AIRAC report.

The Accident. The driver of the insured vehicle was a named insured or household member in 90.1 per cent of all claims.¹³ This percentage is very close to the 89.7 per cent found in the AIRAC study. The average number of vehicles involved in the accident was 2.0, with 98.1 per cent of all claims that resulted from accidents with three or fewer vehicles, and the average number of claimants was 1.6. The claimant in this study was most often the driver of another vehicle (45.9 per cent), followed by a passenger in another vehicle (20.5 per cent), a passenger in the insured vehicle (17.3 per cent), a pedestrian or bicyclist (12.7 per cent), and a motorcycle rider (3.5 per

¹² The tables in Appendix I in the original report provide a detailed breakdown of the distributions for all individual variables in each of these categories.
¹³ The statistical calculations were based on all claims for which data on the particular variable were available. For most variables, very few claims had missing data.
¹⁴ Throughout the remainder of this report we will refer to the driver of the insured vehicle as the "insured driver" without meaning to imply the driver was necessarily a named insured on the policy.
There was an uninvolved witness (individual other than the insured driver or BI liability claimant) who provided his/her name to police or participants in only 41.4 per cent of claims. Moreover, the number of witnesses actually providing statements was even smaller (24.4 per cent). A police report on the accident was filled out for 79.6 per cent of all claims.

Most victims were taken to a hospital immediately following the accident. Over half of all our claimants (61.3 per cent) were taken to the emergency room and released the same day; another 13.6 per cent were admitted for at least one night. A small number (4.0 per cent) were taken directly to a physician's office, 20.1 per cent received no treatment on the day of the accident.

An assessment was recorded of damage by the claimant to the vehicle in which he/she was riding. Bicycles or motorcycles were not considered to be vehicles for this purpose. For those claims that contained the necessary information, the insured driver's assessment of damage was, in general, less than that of either the study claimant or police. According to the insured, there was major damage in 51.6 per cent of the claims for which this information was available. The corresponding percentages were 65.8 per cent for the claimant and 68.3 per cent by the police.

Similarly, coders attempted to obtain an assessment of injury to the claimant, as noted at the accident scene. According to the insured driver, the claimant exhibited no indication of visible injury in 30.8 per cent of our claims. According to the police report, there was no visible injury in 19.7 per cent, and the study claimant indicated no visible injury in only 6.2 per cent of claims.

The Claimant. Female claimants comprised 47.4 per cent of the sample, compared with 52.8 per cent reported by the AIRAC study. The age distribution was quite similar in both samples. As in the AIRAC sample, the proportions of children (0–15 years) and elderly (65 and older) were much lower than in the United States population, and the proportions of youths (16–20) and young adults (21–24) substantially higher.

In this study, the claimant was employed in 63.3 per cent of claims, unemployed in 15.3 per cent, and a minor in 11.8 per cent. It is possible, however, that the percentage of unemployed claimants has been inflated by mis-coding of some non-employed spouses. An attempt was made to differentiate non-employed from unemployed
individuals, but very few claimants (2.2 per cent) were recorded as non-employed spouses.

Only 7.0 per cent of the claimants were found to have one or more liability claims within the past five years. Most of these prior claims were revealed by checking with the Central Index Bureau ("CIB"). Of these, the majority (68.7 per cent) had made only one such claim. It is not clear whether the relatively low incidence of prior claims reflects a truly low incidence of repeat claimants or limitations of the CIB.

The Claim. In this section we consider characteristics of the claim itself, including selected aspects of the policy against which the claim was made. In 75.6 per cent of the claims, the policy was one which had been ceded to the Massachusetts residual market mechanism, the Commonwealth Automobile Reinsurance Facility ("CAR")15. By far the most common individual policy limit in our sample was the minimum $10,000, which accounted for 45.8 per cent of all claims. However, these basic limit claims accounted for only 33.3 per cent of the total dollars paid. Overall, the distribution of limits was weighted much more toward the low end of the spectrum than the AIRAC nationwide sample.14

Nearly half of the claims (47.4 per cent) included a demand for lost wages. However, when restricted to claimants who were actually employed at the time of the accident, this percentage increases to 77.4 per cent (Table 1, Appendix A in the original report). In terms of disability (according to the claimant) 52.2 per cent reported no disability, 41.0 per cent temporary partial disability, and 4.1 per cent permanent partial. There were 10 fatalities (2.5 per cent) and only one permanent total disability (0.3 per cent) in our sample. This distribution is very similar to that obtained by AIRAC.

Claimants were represented by an attorney in the vast majority of cases (88.1 per cent). This result is consistent with the AIRAC data, which indicated attorney representation in 93.2 per cent of the BI liability claims from Massachusetts in their sample and 85.1 per

15 In 1965 and 1966, the percentages of BI liability claims ceded to the Commonwealth Automobile Reinsurers were 49.5 and 54.4 per cent respectively.
16 One reason for the relatively low limits in Massachusetts is that automobile liability insurance is compulsory, leading many reluctant purchasers to obtain only the minimum coverage required by law.
cent for no-fault states as a group, but is higher than the 55.3 per cent for all states. One of the suspicion factors mentioned promi-
nendy by the participants in the focus group was the reputation of the attorney. Certain attorneys develop a reputation for handling a large number of cases, some of which may be of questionable valid-
ity. Claims in which such attorneys appear may deserve more careful scrutiny.

As a first step in exploring this issue, we have computed the number of appearances for each attorney mentioned in the total sam-
ple of 597 claims. Note that since our sample comprised approxi-
mately 1.2 per cent of the total claim population, the number of appearances for a particular attorney in our sample was expected to be roughly 1.2 per cent of the total number of claims represented by the attorney. Thus, for example, an attorney mentioned twice in the sample would have a crudely estimated number of 167 claims during the one-year period covered by our study. Of course, for an individual attorney, the statistical margin of error for such an estimate is enor-
mous, particularly for attorneys mentioned only once or twice. How-
ever, when examined overall, the distribution of estimated "claim volume" is quite revealing.

For the analytic sample (which excludes all Lawrence residents) the great majority of those claims with legal representation involved attorneys who appeared only once (77.4 per cent) or twice (12.8 per cent) in our sample. However, the remaining 9.8 per cent of the claims (accounting for 8.0 per cent of paid dollars) were handled by a small group of attorneys mentioned at least three times who ac-
counted for 37 non-Lawrence cases. Moreover, as we will see below, the same group was involved in 36 of 48 total Lawrence claims. Ex-
trapolating to the entire population would imply that this small cadre managed to process over 6,000 cases during the year covered by our study, accounting for over 17 per cent of all RI liability claims with legal representation filed in the Commonwealth during this period.

We mentioned above that inconsistencies among descriptions of the accident by different sources could be considered significant by adjusters. To measure such inconsistencies, we have created "discrepancy scores" between the information provided by the study

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17. This tally could be conservative because of alternate spellings which were not properly matched. Moreover, this approach takes no account of law partnerships.
claimant, on the one hand, and each insured driver, police, and wit-
nesses, on the other hand. The score was derived by assigning im-
portance weights to each of nine specific items in Part II of Form 2. A
discrepancy between the two sources was given the assigned num-
ber of points, and the total number of points across all nine items
was calculated.18 The assignment of importance weights was some-
what arbitrary and represents only a first cut at quantification.19

We anticipate that this approach may be refined in further anal-
yses. The average discrepancy score for study claimant vs. insured
driver was 1.08, for study claimant vs. police 1.02, and for study
claimant vs. witnesses 1.12. The percentage of discrepancy scores
above 3.0 was 7.9 per cent for the insured driver, 6.6 per cent for the
police, and 4.6 per cent for witnesses. Since a score of 3.0 can be
attained by having a single discrepancy in the accident date or lo-
cation, there seem to be relatively few significant inconsistencies.

The Injury. Information on the nature of the injuries was based
on reports by the initial medical contact and the primary medical
provider. The most frequent locations of injuries were the neck (51.0
per cent) and limbs (51.0 per cent), followed by the back (42.5 per
cent) and head (35.2 per cent). The most frequently reported type of
injury was a strain or sprain (69.6 per cent), followed by lacerations/
cuts (44.2 per cent) and fractures (21.0 per cent).

For further analysis, we divided injuries into three broad classes.
The first class, comprising 32.2 per cent of the sample, consists of
those injuries involving only a strain or sprain. The second class,
containing 37.4 per cent, consists of mixed injuries involving a strain
or sprain and some other injury. The third class consists of non-
sprain/sprain injuries entirely (30.4 per cent).

The Treatment. From the focus group it became clear that ex-
cessive or unnecessary treatment evoked suspicion in the minds of
claims adjusters. We therefore placed considerable emphasis on mea-
suring various aspects of the treatment. We note first that 19.4 per

18. In the case of multiple witnesses, discrepancies involving any of the wit-
nesses were included.

19. The actual weights used were 3.0 for day of accident, accident town, and
study claimant injury; 3.0 for number of occupants in the insured vehicle and in the
claimant vehicle; and 1.0 for the remaining four items.
cent of our study claimants were admitted to a hospital at some point. Of these, 68.8 per cent were admitted on the day of the accident and 31.2 per cent subsequently (Table 2, Appendix N of the original report). The total of 19.4 per cent is higher than the 10.5 per cent reported in the AIRAC study. The types of outpatient providers most often consulted by claimants were medical doctors (82.8 per cent), chiropractors (31.0 per cent), and physical therapists (19.4 per cent). These percentages are all somewhat higher than the corresponding AIRAC percentages.

We have defined the "maximum provider" as the health care provider seen the greatest number of times. The maximum provider was a medical doctor in 48.0 per cent of our claims, a chiropractor in 28.8 per cent, and a physical therapist in 15.1 per cent. The number of visits to the most frequent provider averaged 14.5. However, the number of visits depended strongly on the type of maximum provider. For medical doctors, only 6.2 per cent of claims required over 20 visits. For physical therapists, the corresponding percentage is 26.8 per cent and for chiropractors 49.5 per cent (Table 3, Appendix N of the original report).

Certain health care providers, like attorneys, develop reputations among claims adjusters for treating questionable cases. For each provider mentioned in our data base, we have calculated the number of times he/she appeared as a maximum provider. As was the case with attorneys, a small group accounted for a substantial proportion of all claims. In particular, practitioners who appeared at least three times were responsible for treating 25 non-Lawrence claims and 31 Lawrence claims. The 56 claims in total comprise nearly 19 per cent of the 296 claims (256 non-Lawrence and 40 Lawrence) for which a maximum provider could be identified.

The average total medical expense incurred per claimant was $2,675. Of this total, we estimate that an average of $1,102 was incurred on the day of the accident, $1,305 was related to subsequent outpatient treatment, and $470 was related to other expenses, including subsequent hospitalizations, rehabilitation services, and replacement services. It is possible, however, that some mis-allocation in coding occurred for the details provided by medical bills regarding

20. As with the attorneys, this tally may be conservative because of alternative spellings not properly matched. Moreover, in some cases an institution rather than the individual provider's name could be identified by the coder.
location and time of treatment were sometimes difficult to sort out. For example, diagnostic procedures associated with an emergency room visit may in some cases have been included in the "other expense" category. Outpatient medical expenses tended to drop off gradually after the day of the accident. Of the average outpatient total of $1,305, an average of $397 was incurred during the first four weeks following the accident, $189 during the next four weeks, and $87 during the next four weeks. For the remainder of the year following the accident, the average was $492 ($49 per four-week period), and expenses incurred after one year averaged $141. Including treatment on the day of the accident, the average time to initial treatment was 2.8 days. However, this distribution is highly skewed, with 80.5 per cent of all claimants receiving some treatment on the day of the accident, and 2.7 per cent waiting more than three weeks. Excluding the day of the accident, we find that 71.5 per cent of claimants initiated treatment within one week, 18.3 per cent between one and three weeks following the accident, and 10.2 per cent after more than three weeks.

Relationship Between Injury Type and Treatment

In terms of identifying unusual and potentially suspicious patterns of treatment, it is necessary to relate the treatment to the specific type of injury. As a first step in this direction, we have examined the distribution of the various treatment variables discussed above for each of the three classes of injuries: strain/sprain only, mixed: non-strain/sprain.21 This section highlights the most interesting results.

Not surprisingly, hospitalization is strongly related to injury type. Only 1.6 per cent of claimants with strains/sprains only were admitted to a hospital, while 17.4 per cent of mixed injury claimants and 43.6 per cent of non-strain/sprain required hospitalization. In terms of outpatient health care providers, the most striking differences pertain to the use of chiropractors and physical therapists (see Figure 1). Only 6.9 per cent of non-strain/sprain claimants saw chiropractors, compared with 35.0 per cent of mixed injury claimants and 47.9 per cent of those with only a strain or sprain. While the same general pattern is seen for physical therapists, the relationship

21. The tables presenting full details appear in Appendix F of the original report.
of injury type to utilization is less pronounced. For non-strain/sprain injuries, 10.8 per cent of claimants saw physical therapists, while for mixed and strain/sprain injuries, the corresponding percentages were 21.7 per cent and 25.6 per cent.

The type of maximum provider also depended strongly on the type of injury. For claimants with strains or sprains only, the maximum provider was most frequently a chiropractor (47.3 per cent), followed by a medical doctor (28.8 per cent), and a physical therapist (20.3 per cent). For mixed injuries, medical doctors came first (43.7 per cent), followed by chiropractors (31.0 per cent), and physical therapists (18.3 per cent). For non-strain/sprain injuries, the only type of maximum provider occurring in more than 10 per cent of claims was a medical doctor (76.2 per cent).

For strains/sprains, the average number of visits to the maximum provider was 19.7, for mixed injuries the average was 16.2, and for non-strain/sprain injuries the average was only 6.8. This pattern reflects primarily the different mix of providers who tend to treat the different types of injuries. At the extreme, there were 6.6 per cent of strain/sprain claimants who visited their maximum provider
more than 50 times, compared with 3.5 per cent of mixed injury claimants and 2.0 per cent of non-strain/sprain claimants.

Total medical cost incurred was much higher on average for non-strain/sprain injuries ($5,430) than for mixed injuries ($2,350) or strain/sprain only injuries ($1,614). For claimants with non-strain/sprain injuries, outpatient treatment comprised 37.8 per cent of total medical expenses. For mixed injuries outpatient treatment comprised 57.8 per cent and for strains/sprains 81.4 per cent. The pattern of declining outpatient treatment intensity over time that characterizes claims as a whole tends to hold true for each type of injury separately.

Average time to initial treatment was generally much shorter for non-strain/sprain (0.2 days) and mixed (1.3 days) injuries than for strains/sprains (7.5 days). Nearly all non-strain/sprain and mixed injuries received treatment within the week following the accident, while 9.6 per cent of strain/sprain claimants waited at least a week before obtaining treatment. Similarly, for subsequent treatment excluding the day of the accident, the average time was 8.1 days for non-strain/sprain injuries, 10.9 days for mixed injuries, and 19.5 days for strain/sprain injuries.

Claims without strains and sprains were much less likely to involve high-volume attorneys or maximum providers [Table 4, Appendix N of the original report]. Among non-strain/sprain claims, the percentage involving attorneys appearing at least three times in our sample was only 6.3 per cent, compared with 10.9 per cent for mixed injury claims and 22.4 per cent of strain/sprain claims. Similarly, among non-strain/sprain claims, the percentage involving maximum providers appearing at least three times was 2.9 per cent, compared with 10.9 per cent of mixed injury claims and 14.8 per cent of strains/sprains [Table 5, Appendix N of the original report].

Judgmental Assessment of Claims

In this section we discuss the data derived from Form 2, the judgmental assessments made by the experienced claims adjusters who performed the coding. The information elicited in Form 2 pertains to three general issues:

• Liability of the insured driver
• Types of suspicious claims
• Identification of suspicious claims

Liability

According to the coders, the insured driver was 100 per cent at fault in 64.5 per cent of the claims in the sample. The insured driver was deemed more than 50 per cent responsible in another 12.6 per cent of the claims, exactly 50 per cent in 11.1 per cent, and less than 50 per cent in 11.8 per cent. The relatively high liability assessed for most claims is not surprising, since liability must in theory exceed 50 per cent if a suit claim is to be sustained.

It might be expected that the 11.8 per cent of claims viewed by the coders as having less than 50 per cent liability could be denied. However, the coders indicated that the company should have attempted a denial for lack of liability in only 7.1 per cent of all cases. This apparent conservatism may suggest an appreciation of practical constraints within the tort system on the denial of liability of claims. From a cost-benefit viewpoint, it may be considered preferable to negotiate a compromised payment rather than to deny the claim outright and assume the financial consequences entailed in litigation.

Types of Suspicious Claims

In Form 2, we have attempted to identify suspicious claims in two different ways. First, we asked the coders to specify particular “elements of fraud” which appeared in the claim. Second, we asked whether the claim appeared to reflect deliberate build-up. Taken together, the results of these two approaches help to refine our conceptualization of suspicious claims. Discussions in the preliminary focus group led to the following specification of fraud elements:

1) Duplicate claims for single injury
2) Bills submitted for treatment not rendered

22. See 1996 AIB Chapter 62: Cost Containment Filing (Docket GR-16) for a more complete discussion of the pilot review of suspicious claims conducted by focus group participants. Underlying the specification of fraud elements was the idea that if any of the five factual situations could be proved, the perpetrator would be found guilty of criminal fraud.
3) Non-existent or pre-existing condition unrelated to accident
4) Deliberate misrepresentation of lost wages
5) Other material misrepresentation(s)

Overall, 11.0 per cent of the study claims were thought to contain one or more of these fraud elements. By far the most frequently checked elements were element 3 (7.0 per cent) and 5 (4.5 per cent). Each of the other three fraud elements appeared in very few claims. Indeed, of the 47 claims with fraud indicated, 43 (90.1 per cent of the total sample) had checked at least one of element 3 or element 5.

For claims in which "other material misrepresentation" appeared, the coder wrote a brief description of the type of misrepresentation.12 Most of these descriptions imply that the alleged injury and/or accident never actually occurred or that the injury occurred but was unrelated to the accident. Thus, these incidents are very similar to those with element 3. In retrospect, it is likely that the training of coders did not make clear that element 3 was intended to be interpreted broadly. Thus, for example, some coders may not have understood that element 3 was supposed to cover all staged accidents, "impasts," and injuries that were incurred after the accident.13 In any event, nearly all the claims considered fraudulent can be characterized as involving an attempt to obtain compensation for alleged consequences of an injury which never occurred or was unrelated to the accident.

Claims in which at least one fraud element appeared will be referred to as "apparent fraud" claims. For these claims, the coder was asked to assess whether the file contained sufficient evidence to justify a denial and/or a referral to law enforcement authorities. In all, 11 claims (2.6 per cent) were deemed "actionable," seven were considered deniable only, two referable only, and two both deniable and referable. Table 6, Appendix N in the original report. The relative weight accorded such factors as lack of certainty based on the available information, doubt about the company's ability to defend a denial, or cost-benefit considerations is unknown.

12. A complete list of these unedited descriptions is contained in Appendix G in the original report.
13. A "jump-in" is a claim of an individual who was not actually involved in the accident.
Build-up is an attempt by the claimant and/or health care provider to inflate the damages for which compensation is being demanded. Once again, it is helpful to regard those claims for which build-up was checked as "apparent build-up" and those for which neither fraud nor build-up was checked as "apparently valid" claims. In a build-up situation, the injury is presumed to be real and caused by the accident, but the damages are exaggerated. Thus, in theory, we would not expect an overlap between apparent fraud and apparent build-up. In fact, however, a substantial overlap occurs (see Figure 2). Of the 31.7 per cent of claims cited for either fraud or build-up, 20.7 per cent involve build-up alone, 2.6 per cent fraud alone, and 8.5 per cent both fraud and build-up. Thus, most of the claims with fraud elements were also designated as build-up claims.

This overlap may reflect the ambiguity inherent in the available information. Stated differently, the facts of the case present in the claim file may be inadequate to allow a strict verification of the injury as being both real and accident-related for the 8.5 per cent of

**FIGURE 2**

Types of Suspicious Claims

- Apparent Fraud Only: 26%
- Apparent Build-up Only: 20.7%
- Apparent Build-up and Fraud: 8.5%
- Apparently Valid: 68.3%
claims cited for apparent fraud and build-up. At the risk of over-
simplification, we can infer that claims tend to fall into a hierarchy of
suspiciousness. The relatively large number (29.1 per cent) of sus-
pected build-up claims are those for which the injury is real and
related to the accident, appears exaggerated and treatments appears
excessive. The smaller number (11.0 per cent) of suspected fraud
claims are primarily those for which the injury appears to be fabri-
cated or unrelated to the accident. The still smaller subset (2.6 per
cent) of actionable claims are those for which the available evidence
of fraud is quite definitive.

For the suspected fraud claims that are not deniable, the amount
of additional evidence required to determine their deniability and
the cost of obtaining that evidence are not clear. Nor can we estimate
the proportion of these claims that would ultimately result in a de-
termination of statutory fraud. These questions are important and
merit investigation in future research efforts. Build-up of medical bills or
lost wages can be intended to raise the special damages over the
tort threshold and/or to inflate general damages. Build-up can
involve medical bills, lost wages, or disability. According to the judg-
ments of the coders, build-up represented an attempt to exceed the
tort threshold in 56.5 per cent of build-up claims, and to inflate the
general damages in 84.7 per cent (Table 7, Appendix N of the original
report). Inflation of medical bills was suspected in 71.0 per cent of
build-up claims, inflation of lost wages in 11.3 per cent, and inflation of
disability in 46.8 per cent (Table 8, Appendix N of the original
report).

The previous section noted that various aspects of treatment de-
pended strongly on the type of injury involved. This section explores
the relationship between type of injury and perceptions of fraud and
build-up (see Figure 3 and Table 14, Appendix N of original report).
Not surprisingly, the percentage of apparently valid claims was high-
est for non-strain/sprain injuries (88.0 per cent), followed by raised
injuries (64.6 per cent) and strains/sprains (46.8 per cent). It is rather
remarkable that fewer than half the claims involving only strains or
sprains were judged apparently valid. Conversely, the proportion of
apparent fraud claims was highest for the strain/sprain injuries (16.9
per cent), followed by the mixed (12.5 per cent) and non-strain/sprain
injuries (6.0 per cent).
Identification of Suspicious Claims

Ideally, it would be possible to derive a set of objective "fraud indicators" that would identify accurately true cases of build-up and fraud. Claims fulfilling certain criteria could be targeted for more intensive investigation and possibly denial. It is conceivable that multivariate statistical modeling would lead to useful fraud indicators. However, such modeling would require a set of data in which the true build-up and fraud cases were known.

Although our Baseline Study can only identify apparent build-up and fraud, our data may provide insight regarding the potential utility of fraud indicators. To explore this issue, we first examined the specific factors that influence claims adjusters in their evaluation of a claim. Can we at least determine which particular subjective factors occur relatively frequently and weigh relatively heavily? Such factors may form the conceptual basis underlying a useful model. We attempted to develop objective counterparts to the subjective factors. To what extent do these objective analogs capture the critical information upon which the adjusters' opinions are based? We begin by examining the frequencies of various specific factors.
Frequency of Individual Factors. For each study claim, the coder was asked whether any specific aspects of the claim "would lead [you] to label the claim as suspicious or fraudulent?" For claims with an affirmative response, the coder was instructed to indicate which particular factors influenced the "assessment of the claim as suspicious or fraudulent." A list of 18 specific factors suggested by the pilot review of highly suspicious claims was presented. These factors fell into five categories: verification of accident (five factors), injuries (four factors), treatment/recovery (five factors), reputation of professionals (two factors), and employment (two factors). In addition, space was provided for other factors not covered by the list.

The total number of factors checked ranged from zero to 10, with an average of 1.2 per claim. Among the 31.5 percent of claims with at least one factor noted, the average was 3.7. In terms of individual factors, the frequencies ranged from 0.7 per cent to 19.7 per cent. Figure 4 shows the ranking of the individual factors in terms of frequency. The top five factors all relate to the injury and treatment/recovery. Factors related to verification of the accident circumstances were mentioned much less often.

![Graph showing the frequency of individual factors](image-url)
The relatively low frequency of factors related to accident verification is consistent with the low discrepancy scores noted above. These results seem to imply that it is quite unusual to catch the claimant in an outright misrepresentation of the accident circumstances.

Somewhat surprisingly, the reputation of the attorney (4.9 per cent) and the reputation of the MD or chiropractor (6.3 per cent) were ranked near the middle. We did not expect the reputation of an attorney or health care provider to be known to the coder unless, by coincidence, the claim was from a geographical area in which the coder had worked. Thus, the true importance of these factors may be substantially underestimated in our data.

Identification of Build-up and Fraud.

Subjective Assessment. This section examines the relationships between various suspicion factors and the claim designation as build-up and fraud. Figure 5 shows the percentage of apparent build-

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35. The tables upon which this discussion is based are found in Appendix H of the original report.
up as a function of the number of suspicion factors. The results are rather dramatic. For claims with no factors, the percentage of apparent build-up is only 4.5 per cent. This percentage rises to 58.3 per cent for claims with one factor, and 88.2 per cent for claims with two or more factors.

For each particular category of subjective suspicion factors, the same general pattern is evident. Claims with no factor in the category tend to have a low probability of being deemed apparent build-up, while those with at least one factor have a very high probability. In terms of traditional criteria for predictive validity, we can say that reliance on any category of factors would yield high specificity. That is, the risk of falsely predicting apparent build-up when it is really absent is rather low. However, the categories are not all equal in terms of sensitivity, the ability to detect apparent build-up when it is actually present.

Only the injury and treatment/recovery categories have high sensitivity as well as specificity. For example, suppose we defined apparent build-up operationally to be the existence of one or more injury factors. Then, the estimated probability of detecting an apparent build-up case (sensitivity) would be 0.74. Similarly, for the treatment/recovery category the estimated sensitivity would be 0.75. For each of the other categories, the sensitivity is less than 0.30.

We observed above that apparent fraud cases tended to be a subset of the apparent build-up cases. Thus, we might expect that the particular factors predictive of apparent fraud would be a subset of factors related to apparent build-up. To isolate these particular factors, we studied the relationship between apparent fraud and various categories of factors among those claims in which apparent build-up occurs. Figure 6 shows the percentage of apparent fraud as a function of the total number of factors. For claims with fewer than five factors, the percentage deemed fraudulent remains low. Overall, the percentage is 15.5 per cent for such claims. For claims with five factors, the percentage rises to 41.2 per cent, and for claims with six or more, it reaches 69.6 per cent. Thus, the existence of multiple factors is suggestive of fraud, but by no means definitive.26

26. The tables in Appendix H of the original report show the percentage of apparent fraud as a function of the number of factors in the various categories. Within each category, some limited relationship is indicated. However, no strategy could provide the basis for distinguishing apparent fraud with reasonable predictive validity.
Objective Assessment. The previous section demonstrated that subjective suspicion factors allow accurate identification of apparent build-up, but that apparent fraud could be differentiated from build-up with only limited predictive validity. This section explores the extent to which objective factors allow identification of apparent build-up and fraud.

For each of the 18 specific subjective factors listed on Form 2, we attempted to develop an objective analog by using the information collected in Form 1. For example, the first factor on the list was: “Police report not filed.” Since the coder had recorded whether a police report was actually filed, we defined objective factor element 1 to be the absence of a police report. It might appear that in this instance, we are able to capture very precisely the essence of judgmental factor number 1. Unfortunately the absence of a police report per se is not especially suspicious. Although the police report was indeed missing in virtually all instances in which judgmental factor 1 was checked, the converse was not true. The vast majority of claims with no report were not deemed suspicious on this basis. Thus, it appears that the significance of a missing police report de-
pends to some extent on a broader context which the adjuster is taking into account.

The same phenomenon tends to occur for the other judgmental factors also. Even where the meaning of the factor seems relatively clear, the adjuster's judgment is not a simple mechanical exercise that can be reduced to objective criteria. Thus, although it is conceivable that a sophisticated analysis of objective factors could produce accurate identification of fraud and build-up, our a priori expectations are not very optimistic.

As a first step in exploring this issue, we attempted to replicate the analyses described above, substituting objective analogs for the judgmental factors to the extent possible. As before, we began by examining the relationship between the percentage of apparent build-up and the total number of factors. The results are shown in detail in Appendix I in the original report and are summarized in Figure 7. It is clear that a predictive relationship between apparent

![Figure 7](image)

**FIGURE 7**
Build-up by Number of Objective Factors

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37. In Appendix I of the original report, we presented the objective factors we have derived.
build-up and the number of objective factors exists. The percentage of apparent build-up claims rises steadily as the number of factors increases.

Unfortunately, in terms of predictive validity, the objective factors are much less useful than their subjective counterparts. Neither the total number of factors nor the number in any specific subgroup offer combinations of sensitivity and specificity of practical value. For example, suppose we adopted as a screening criterion the presence of four or more objective factors. Then, the proportion of all apparent build-up claims detected by this criterion (sensitivity) would be only 0.22.

For identification of apparent fraud, the situation is even worse. As Figure 8 illustrates, virtually no relationship exists between the number of objective factors and the percentage of apparent fraud claims. So, at least on the basis of this preliminary analysis, we infer that the subjective bases upon which the coders attempted to distinguish fraud from build-up cannot easily be explicated.

Disposition of Claims

Aspects of Claims Adjustment

This section develops a profile of BI liability claims in terms of the way they are handled by claims adjusters. We first consider various components of the investigation process and then the pattern of resulting outcomes.

Investigation. We noted above that a record of one or more liability claims by the claimant during the past five years was discovered in only 7.0 per cent of the claims. The primary source of such information was the CIB. In our analytic sample, a CIB report was filed in 55.1 per cent of claims. Thus, in the vast majority of such instances, no information about the claimant's prior record was returned.

Referrals to outside agencies for special investigation were practically non-existent. There were no referrals to the Insurance Crime Prevention Institute ("ICPI") or to law enforcement authorities.

28. The ICPI is an industry-funded national organization whose purpose is to facilitate cooperative investigations with law enforcement groups.
There was one referral to a company Special Investigation Unit ("SIU") and two referrals to unspecified agencies. A wage verification was performed in 32.9 per cent of all claims, and 71.1 per cent of those claims in which lost wages were claimed (Table 9, Appendix N of the original report). An independent medical examination was attempted in 14.4 per cent of all claims and actually conducted in 11.3 per cent—somewhat higher than the 7.2 per cent found by AIRAC in its national study. Medical bills or insurance statements failed to cover all claimed medical expenses in only 11.7 per cent of claims.

An outside audit of medical expenses was conducted for only 1.6 per cent of claims, and an activity check for 1.9 per cent. A site investigation took place for 12.5 per cent of all claims.

**Outcome.** As anticipated, most of the claims (88.5 per cent) were closed as of the time of coding.\(^\text{29}\) In all, 84.5 per cent were closed and

\(^{29}\) This percentage is somewhat lower than expected, because it is based on the analytic sample, which excludes all claims which failed to materialize, claims with PIP subrogation only, and Lawrence claims.
paid, 4.0 per cent were closed without any payment, and 11.5 per cent remained open. Of the 17 claims which were closed without payment, two were denied because of lack of policy coverage, four for lack of liability, five because the claim was withdrawn, and six for unspecified other reasons.

Lawsuits were filed in 27.7 per cent of the claims. This rate is nearly double the 14.1 per cent reported by AIRAC for its Massachusetts sample, and substantially higher than the 18.1 per cent nationwide result. The ultimate disposition of these lawsuits cannot be direct compared with the AIRAC data, because the claims are not all closed. However, the data are consistent with the general finding that nearly all lawsuits are settled before trial. Of the 76 closed claims that involved lawsuits, 74 were settled prior to trial, one was settled at trial, and one was tried to a verdict.

The average "current value" of claims in the sample was $8,757. (The current value is defined as the actual amount paid for closed claims and the most recent reserve established for open claims.) The current value was between $2,001 and $10,000 for 64.5 per cent of the claims, and only 4.2 per cent of claims had values over $25,000. However, these large claims account for 22.2 per cent of total dollars paid out.

The breakdown of paid damages into specific components is of considerable interest, but it is difficult to obtain. In evaluating a claim, the adjuster will usually attempt to assess medical, lost wage, and general damage components. These calculations are the basis for negotiations with the claimant. However, for at least three reasons, these theoretical calculations do not translate directly into the actual settlements amount.

First, the adjuster may reduce the amount offered to reflect contributory negligence. Second, the total payment may be capped by the policy limits. Third, the process of negotiation may result in a payment that differs substantially from the adjuster's theoretical valuation of the claim. When a final settlement is reached, the adjuster has no reason to go back and allocate the resulting payment to specific components. Consequently, it may be impossible to perform the allocation in a meaningful way.

To circumvent these difficulties, our analysis was limited to a subset of claims for which the problems described above are minimal. We have included closed paid claims for which the insurer assessed the driver of the insured vehicle to be 100 per cent responsible,
and is which the paid amount was less than the individual policy limit. For this restricted group, we have calculated the total medical expenses, the lost wages, and the general damages.

The average total payment for these claims was $7,520. The average medical component was $1,381 and the average lost wages component $422, leaving $5,718 for general damages. The percentage breakdown is shown in Figure 9. Subject to the qualification that the subset of claims analyzed may not be representative, these results suggest the kind of breakdown we might expect under a system with no constraints imposed by comparative negligence or policy limits. In particular, we might expect that general damages would comprise about 76 per cent of the total dollars paid.

A related issue of some practical importance is the relationship between general and special damages. Is the amount of general damages correlated with either the total medical expense or the amount
of lost wages? In a separate investigation of this question, we deter-
mined that general damages were strongly correlated with medical
expenses, but uncorrelated with lost wages.30

**Relationship between Judgmental Assessment and Claim Disposition**

Does the way a claim is handled depend on the adjuster’s assessment
of possible fraud? To explore this issue, we calculated separately the
distribution of the disposition variables for claims falling in each of
four categories:

- Apparent fraud only
- Apparent build-up only
- Both apparent fraud and build-up
- Apparently valid

The complete set of tables summarizing the results are presented
in Appendix R of the original report. For the most part, there are no
dramatic differences in terms of either the investigation or outcome
for the different groups. This section highlights those differences
that may be important.

A report to the CIB was filed for 50.7 per cent of the claims that
were judged apparently valid. The percentage of CIB reports was 64.4
per cent for claims not considered to be apparently valid. Thus, the
prior records of claimants involved in the more suspicious claims
did attract somewhat more scrutiny. An Independent Medical Ex-
amination (“IME”) was attempted for 11.1 per cent of the claims
judged apparently valid. For apparent-fraud-only claims, the per-
centage was 27.3 per cent, for build-up-only claims 19.5 per cent,
and for fraud-only 25.0 per cent. Thus, while it was requested for
only a minority of claims deemed to be suspicious, an IME was much
more likely to be sought for such claims. We mentioned above that
an outside audit of medical expenses was performed very rarely.
Only 1.6 per cent involved a medical audit. However, for claims in-
volving apparent fraud [with or without apparent build-up], the per-
centage with medical audits was 10.6 per cent.

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30. See Exhibit 16, AIB Rebuttal Filing (Oct. 16, 1989), Commonwealth of Mas-
achusetts Division of Insurance, Docket GB–21.
We might expect that claims involving fraud or build-up would be more likely to be either open or closed without payment. For claims judged apparently valid, 16.5 per cent were open or closed without payment. The corresponding percentage was 16.2 per cent for claims involving only apparent build-up, 18.2 per cent for claims involving only apparent fraud, and 39.4 per cent for claims involving both.

For apparently valid claims, the percentage involving lawsuits was 27.1 per cent. The corresponding percentages for the other groups were similar, with the exception of the claims displaying both apparent build-up and fraud (44.4 per cent).

The Lawrence Claims

The analyses in the previous sections excluded the 48 claims in which the claimant was a resident of Lawrence. We now turn to these Lawrence claims. As explained above, anecdotal reports and statistical evidence strongly suggest the existence of an extensive fraud operation in the Lawrence area. An understanding of the dynamics of this activity could provide insights useful beyond this particular situation.

While the Lawrence claims are not examined in as much detail as the main analytic sample, our description generally parallels the discussion above. We highlight important comparisons between the Lawrence and non-Lawrence claims in terms of the characteristics of claims, the judgmental assessment, and the disposition of claims.31

Characteristics of Lawrence Claims

The Accident. The driver of the insured vehicle was a named insured or household member in 81.3 per cent of the Lawrence claims. The average number of vehicles involved in the accident was 2.0 (the same as for non-Lawrence claims). However, the average number of total BI liability claimants for the accident in which the

31. The tables from which the statistics presented in the following discussion are drawn can be found in Appendix I of the original report.
claimant was involved was 3.9, which is much higher than the 1.6 for non-Lawrence claims. Most of the claims involved two or more claimants (78.3 per cent) compared with 37.9 per cent for non-Lawrence claims, and 37.0 per cent involved five or more claimants, compared with 3.1 per cent for the non-Lawrence claims! The claimant was much more likely to be a passenger (68.1 per cent) than in non-Lawrence claims (37.6 per cent).

Witnesses were available in even fewer (20.0 per cent) claims than for non-Lawrence claims (41.4 per cent), and police reports were filled out in only 51.1 per cent of Lawrence claims, compared with 79.6 per cent of the non-Lawrence claims. Only 2.1 per cent of the Lawrence claimants were admitted to a hospital on the day of the accident, compared with 13.6 per cent of non-Lawrence claimants, and more of the claims involved no treatment on the day of the accident (43.7 per cent vs. 20.1 per cent).

The Claimant. Female claimants comprised 50 per cent of the sample, which is similar to female representation among non-Lawrence claimants (47.4 per cent). However, the age distribution was very heavily skewed toward the 25–44 age group, which constituted 74.5 per cent of the Lawrence claimants vs. 35.8 per cent of the non-Lawrence claimants. Relatively few of the Lawrence claimants were employed (33.3 per cent vs. 63.3 per cent). This finding is particularly striking in light of the age distribution. Perhaps some claimants hid their employment to avoid inquiries that might disclose their true physical condition. Among Lawrence claims, 8.3 per cent of the claimants had one or more liability claims within the previous five years. The corresponding percentage of non-Lawrence claims was similar (7.0 per cent).

The Claim. Nearly all Lawrence claims were against policies that had been ceded to the reinsurance facility (95.7 per cent). Most claims (64.6 per cent) were against policies with minimum $10,000 individual limit coverage. Lost wages were claimed in 28.8 per cent of the claims. However, when restricted to employed claimants, the percentage becomes 76.9 per cent (Table 10, Appendix N of the original report), which is virtually identical to the corresponding percentage for non-Lawrence employed claimants (77.4 per cent). Medical bills covering all claimed expenses were presented in nearly all claims (93.6 per cent). The number of claims involving disability was
much smaller (23.2 per cent vs. 47.8 per cent) than for the non-Lawrence claims.

All Lawrence claimants [110 per cent] were represented by attorneys. Moreover, 75.0 per cent were represented by attorneys who had appeared on behalf of the claimants three or more times in our sample. This figure is rather remarkable, considering that only 9.8 per cent of non-Lawrence claimants were represented by such attorneys. It suggests that a small number of attorneys may play a prominent role in generating the enormous volume of Lawrence claims.

The discrepancy scores for the Lawrence claims were quite low. There was not a single claim with any discrepancy score above 3.0. In part, these low scores may reflect a somewhat greater absence of any information from the participants, so that the possibilities for discrepancies are more limited. Of course it is also conceivable that if fraud were involved, the participants may have collaborated to be sure that their stories were consistent.

The Injury. The Lawrence claims were predominantly neck and back strains or sprains. The most frequent locations of injuries reported were the neck (81.0 per cent) and back (81.0 per cent), followed by limbs (27.1 per cent), head (8.2 per cent) and "other" (8.3 per cent). Compared with non-Lawrence claims there were more strains/sprains (95.8 per cent vs. 69.6 per cent) and fewer lacerations/contusions (16.7 per cent vs. 44.2 per cent), contusions (2.1 per cent vs. 8.3 per cent), fractures (6.2 per cent vs. 2.1 per cent), and internal injuries (0.0 per cent vs. 4.7 per cent). In terms of our broad classification of injury types, many more of the Lawrence claims (75.0 per cent vs. 32.2 per cent) involved only a strain or sprain, and very few (4.2 per cent vs. 30.4 per cent) were non-strain/sprain injuries.

The Treatment. Only 4.2 per cent of the Lawrence claims required admission to a hospital, compared with 19.4 per cent for the non-Lawrence claims. Treatment by a chiropractor was much more common among Lawrence claims (88.9 per cent) than non-Lawrence claims (51.0 per cent). Treatment by an MD was less likely (64.4 per cent vs. 83.8 per cent) and treatment by a physical therapist was rare (4.4 per cent vs. 19.4 per cent). The maximum provider was very likely to be a chiropractor (90.7 per cent).

The average number of visits to the maximum provider was 26.1, with 72.3 per cent of claimants having between 21 and 50 visits.
Most Lawrence claimants (77.5 per cent) were treated by maximum providers who appeared at least three times in our sample. Coupled with the similar patterns for lawyers noted above, this remarkable finding suggests that a small group of healthcare providers (predominantly chiropractors) and attorneys working together may be at the heart of the Lawrence situation.

The average total medical expense incurred per Lawrence claimant was $1,466, about half of the non-Lawrence average ($2,875) but similar to the average expense for the non-Lawrence strains/spains ($1,614). Most of the medical expense was attributable to outpatient treatment (87.7 per cent). This proportion is similar to the corresponding percentage for non-Lawrence strains/spains (81.4 per cent). Thus, the treatment expenses for Lawrence claims do not seem particularly unusual in relation to the types of injuries reported.

The timing of treatment does, however, appear somewhat different. For the Lawrence claims most of the outpatient treatment (89.0 per cent) expense was incurred within the first 12 weeks following the accident, compared with only 51.6 per cent of non-Lawrence claims overall and 52.2 per cent of strain/spain claims. Lawrence claimants tended to seek treatment very quickly. The average time to initial treatment was only 0.7 days, compared with 2.8 days for non-Lawrence claimants. Excluding the day of the accident, the average time to subsequent treatment was 4.5 days compared with 12.6 days for non-Lawrence claimants. It is particularly noteworthy that despite the predominance of strains and sprains, subsequent treatment was initiated within one week by 91.5 per cent of Lawrence claimants. For non-Lawrence claimants with strain/spain injuries, 66.7 per cent initiated subsequent treatment within the first week.

Judgmental Assessment of Lawrence Claims

In terms of liability, the Lawrence claims are similar to non-Lawrence claims. The insured driver was deemed by the coder to be 100 per cent liable in 60.4 per cent of claims, and at least 50 per cent at fault in 95.8 per cent. Denial for lack of liability was recommended in just 2.1 per cent.

Nine of the 48 Lawrence claims (18.8 per cent) were judged by the coders as apparently fraudulent, compared with 11.0 per cent of the non-Lawrence claims. The fact that this percentage is not higher
may yield a useful insight. While the overall pattern of Lawrence claims is highly suspicious, most individual claims look rather ordinary. Thus, at least in the care of Lawrence, a global approach to the problem that addresses its root causes in a systematic way may be more successful than an approach that requires the ability to delineate clearly which particular claims are fraudulent. This point is reinforced by the finding that codes did not recommend denial of the claim for any Lawrence claims, and recommended referral to a law enforcement agency for only two (4.2 per cent).

Apparent build-up was attributed to 88.7 per cent of all the Lawrence claims and to 75.0 per cent of the strain/sprain claims (Table 15, Appendix N of the original report). The corresponding values for non-Lawrence claims are 29.1 per cent and 50.0 per cent. Thus, the coders seem to be saying that most Lawrence claims are excessive even if the injuries were real and caused by the accident. Whether the injuries were in fact real and accident-related was much more difficult to determine.

In 75.8 per cent of Lawrence apparent build-up claims the coders believed the build-up represented an attempt to exceed the tort threshold and in 90.9 per cent an attempt to inflate the general damages (Table 11, Appendix N of the original report). Inflation of medical bills was suspected in 84.3 per cent of the build-up claims, inflation of lost wages in 5.3 per cent, and inflation of disability in 42.4 per cent (Table 12, Appendix N of the original report).

Not surprisingly, the average number of suspicion factors per Lawrence claim (3.9) was considerably higher than the average of 1.2 observed for non-Lawrence claims. Among the claims with at least one factor, the average number was 5.4. Figure 10 illustrates the ranking of individual factors in terms of frequency. Although the ordering of factors is generally similar to that for non-Lawrence claims (see Figure 4), the frequencies are much higher. Of particular interest is the high percentage (39.6 per cent) of claims deemed suspicious because the MD or chiropractor "has appeared on several questionable cases."

We noted above that for non-Lawrence claims the number of factors was closely related to the probability of apparent build-up. For example, claims with two or more factors had a high probability (0.88) of being apparent build-up. In Appendix M of the original report we present a set of tables analogous to those in Appendix H, showing the relationships between subjective suspicion factors and
FIGURE 10
Frequency of Suspicion Factors: Lawrence

the identification of apparent build-up and fraud. The relationships for the Lawrence claims are generally similar to those for non-Lawrence claims, suggesting that similar standards were applied by the coders in making judgmental assessments.

A report was made to the CIB in 48.9 per cent of the Lawrence claims, compared with 55.1 per cent for non-Lawrence claims. The single referral to an outside agency was to a company SHU. A wage verification was performed in six of the 10 claims in which a claim for lost wages was made (Table 18, Appendix N of the original report). The rate is roughly similar to the 70.7 per cent for non-Lawrence claims. An IME was attempted in 14.6 per cent of the Lawrence claims and conducted in 12.5 per cent. In no instances was an outside medical audit or an activity check conducted, and there was only one site investigation [2.1 per cent]. Overall, the low level of claim investigation is consistent with the notion that the accidents and

32. In Appendix M of the original report, we present a set of tables analogous to those in Appendix H, showing the relationships between subjective suspicion factors and the identification of apparent build-up and fraud.
damages corresponding to individual Lawrence claims appear quite unremarkable.

All 48 of the Lawrence claims were closed, with 47 paid and one claim withdrawn. Lawsuits were filed in only 12.5 per cent of Lawrence claims, compared with 27.7 per cent of non-Lawrence claims. The current value of Lawrence claims was an average less than half that of non-Lawrence claims ($3,907 vs. $8,759). Even when restricted to strain/sprain injuries only, the Lawrence claims are relatively "cheap" ($3,519 vs. $7,048). The small amount of potential loss at stake in each claim helps to explain why intensive investigation may not be deemed cost-effective.

Summary and Conclusions

Progress toward Objectives

1) Profile of Bodily Injury Claims

Policy discussions regarding cost-containment in general and fraudulent claims in particular have been based on very limited factual information about the nature of BI liability claims. A refined taxonomy of the main types of BI liability claims has not been developed yet, but the descriptive statistics throughout this report paint a useful picture of the claims themselves and how they are handled by insurers. We summarize here a few of the most interesting findings. Rather than recapitulating specific details, we offer some provocative generalizations that our results suggest.

• We note that most injuries for which compensation was sought were relatively minor, and the resulting payments rather modest in size. The average medical expense was $2,875, and the total payment averaged $8,759. The vast majority of claims involved either no disability or temporary partial disability. Strains and sprains played some role in about 70 per cent of all claims. Moreover, in most instances the opportunity for a large payoff was restricted by relatively low coverage limits.

• The role of the legal profession in generating BI liability claims merits further scrutiny. Nearly nine of 10 claimants were represented by attorneys, and preliminary evidence suggests very
high claim-volumes attributable to certain practitioners. Thus, it seems likely that some lawyers have become very successful in attracting BI liability claimants and efficient in handling these claims. We may also speculate that a high-volume practice may facilitate or stimulate the pursuit of questionable claims. This hypothesis is supported by the relative importance to claims adjusters of the attorney’s reputation, by the fact that the high-volume attorneys handle proportionately more cases that involve only soft tissue injuries, and by the unusually high participation of attorneys in claims made by Lawrence residents.

- The role of the chiropractic profession also invites further investigation. Our initial results support the strong opinion articulated during the focus group that chiropractors are heavily involved in the treatment of automobile accident victims. Overall, nearly a third of claimants visited a chiropractor. For claimants with strains and sprains only, nearly half were treated by chiropractors. As with attorneys, certain practitioners appear to treat very high volumes of BI liability claimants. The perceived importance as suspicion factors of excessive treatment by a chiropractor and the health care provider’s reputation reinforce the idea that some chiropractors may be contributing to generating questionable claims.

- Adjusters tend to regard fraud primarily as an attempt to obtain compensation for alleged consequences of an injury which never occurred or was unrelated to the accident. This definition makes clear what facts must be proved to deny a claim. If it can be demonstrated that the accident or injury are fictitious or that the injury is unrelated to the accident, the inference of a deliberate attempt to mislead the insurer is difficult to avoid. Adjusters regard build-up as a deliberate attempt to inflate the damages for which compensation is sought. In a build-up situation, the injury is presumed to be real and related to the accident, but the damages are exaggerated. Build-up is inherently subjective, because the provider’s assessment of the injury’s severity and the appropriate course of treatment can legitimately vary across health care providers. Thus, even if all the observable facts about the accident, injury, and treatment
were known, an inference of build-up would require evidence about the intention of the suspected perpetrator.

- The claim files contain relatively little hard evidence upon which to base a denial or a referral to law enforcement authorities. Statements from witnesses are rarely available, and details provided by participants are often rather sketchy. Few meaningful inconsistencies occur among reports by various participants. Information on prior claims obtained from the Central Index Bureau is not particularly useful. Medical bills covering all claimed expenses are almost always available. As a consequence, very few claims are in fact closed without any payment or are referred to law enforcement authorities.34

2) Extent of Factors Possibly Related to Fraud

The coders identified all instances of apparent fraud and build-up among the sample claims. The coders classified 11.0 per cent of the claims as apparent fraud and 29.1 per cent as apparent build-up. There was a substantial overlap (8.5 per cent of all claims) between apparent fraud and build-up. We interpret this overlap to reflect the coder's uncertainty that the injury was real and accident-related.

Coders were asked to indicate which particular suspicious factors influenced their assessments. Factors related to the injury, treatment, and recovery were most frequent, along with the reputations of the physician and attorney. The relationship between the suspicion factors and build-up was quite strong. For example, a claim with at least two factors was very likely to be deemed apparent build-up. However, isolating cases of apparent fraud within the larger category of apparent build-up was problematic. Even though the presence of multiple factors was suggestive of fraud, the relationship was much less definitive. This inability to differentiate fraud from build-up is consistent with the relatively low frequency of suspicion factors related to the verification of accident circumstances. The coders appear to be saying that it is unusual to catch the claimant in the sort of blatant misrepresentation required to substantiate that the injury was fictitious or unrelated to the accident.

34. Recall that the study excluded potential claims for which reserves were established but which failed to materialize. Such claims are of course closed without payment.
Finally, the judgmental assessment is strongly related to the kind of injury. For claims that involve only strains or sprains, only 46.8 per cent were judged apparently valid. This percentage increased to 64.6 per cent for mixed injuries and 88.0 per cent for claims not involving strains or sprains. Put differently, only 10.7 per cent of the claims identified as suspicious do not involve soft tissue injuries. Thus, although not in themselves indicative of misrepresentation, strains and sprains provide the opportunity for fraud or build-up to occur.

3) Relationships between Objective Characteristics and Suspiciousness

Our analyses suggest that efforts to identify fraud and build-up by objective characteristics may meet with limited success. We attempted to create objective analogs for each of the subjective suspicion factors. Using these factors in place of the subjective factors reduced dramatically their predictive validity.

Of course, it is possible that more sophisticated statistical modeling would improve substantially our ability to identify fraud and build-up. Moreover, additional data may be gleaned from claim files to supplement the items recorded on Form 1. So, while the initial efforts are somewhat discouraging, we would certainly not rule out the possibility of developing useful objective fraud indicators eventually.

4) Statistical Distributions of Damages

Underlying this objective was primarily the idea of exploring the possibility of identifying treatment patterns that were correlated with fraud and/or build-up. Conversely, we were interested in whether we can begin to suggest norms for appropriate treatment of particular types of injuries, either in terms of number of visits or dollar amounts. For example, do our data suggest that treatment of strains and sprains by a chiropractor beyond some cut-off would be highly suspicious or unreasonable? Though our data base contains a wealth of information about treatment patterns, we have not yet been able to exploit its potential for development of normative standards.

Conclusions

Based on the judgmental assessments of the experienced claims adjustment personnel who performed the coding, we can infer that
significant theoretical potential exists for reducing BI liability losses. Excluding Lawrence claims, the coders identified 11.0 per cent of claims in the main analytic sample (accounting for 12.8 per cent of paid dollars) as apparent fraud, and 29.1 per cent (accounting for 29.4 per cent of paid dollars) as apparent build-up. Nearly a third of all claims were deemed suspicious in at least one respect.

As a practical matter, it may be difficult under the current tort system prevailing in Massachusetts to achieve a substantial reduction in losses attributable to suspicious claims. The inherently subjective nature of build-up makes it hard to distinguish it from treatment that is merely conservative. Proof of fraud requires an intensive and costly investigation with limited prospects of success.

Despite these structural problems, it is conceivable that the existing system can be strengthened by improving training of claims adjusters and refining investigatory tools and procedures. Moreover, the overall deterrent value of these efforts may justify them beyond narrow cost-benefit considerations. It is possible that educational efforts focusing on statewide patterns would broaden the perspective of individual claims adjusters and suggest appropriate areas to focus resources.

Developing an effective deterrent would, however, require vigorous statewide legal enforcement to follow through on leads generated by adjusters. Given the elusive nature of fraud and build-up, intensive criminal investigation appears necessary to support successful prosecution. Ongoing research to disclose patterns of suspicious claims can be helpful in guiding investigatory efforts. Our results indicate that patterns of claims that involve high-volume attorneys and physicians may be particularly worthy of careful examination.

The situation in Lawrence is instructive in highlighting the potential for unscrupulous claimants and professionals to the existing system. Individually, the Lawrence claims tend to be rather unremarkable in most respects. However, the statistical distribution of the claims is highly unusual and strongly suggestive of widespread fraud.

Future Research

The analyses undertaken so far represent a useful first step toward understanding the nature of BI liability claims. Much more can be
done to exploit the potential of the data base already created. In addition, the baseline study can provide guidance to further data collection efforts. We offer here some suggestions for future research.

We mentioned above that the data base contains information relevant to treatment patterns for various types of injuries. One of our objectives was to explore the possibility of developing normative guidelines or standards for appropriate treatment. Rather than simply to rely on subjective intuition to assess the amount or appropriateness of treatment, claims adjusters could refer to objective data. A careful analysis of the distribution of claims in terms of various parameters of treatment would represent an important step in this direction.

We have given a useful description of the claims overall, but we have yet to attempt to derive a taxonomy of claims. It is possible that claims fall into a relatively small number of meaningful categories. Understanding the nature of such categories and the relative frequency with which different types of claims occur could prove very useful in formulating effective policy recommendations. Some form of cluster analysis may be a useful statistical approach to develop a taxonomy.

Our analyses suggest that it may be difficult to capture in objective terms the criteria adjusters apply in attempting to detect fraud and build-up. However, it is possible that a multivariate statistical analysis would be more successful. Perhaps certain combinations of objective elements are indeed predictive of apparent fraud and build-up, even if the adjusters do not appear to rely primarily on such elements in making their assessments. In particular, the role of inconsistencies among the descriptions of the accident provided by different sources should be subjected to more sophisticated analyses before reaching a final conclusion about their significance.

The data we have developed that permits high-volume attorneys and physicians are extremely suggestive, but represent only a first look at this important issue. Within our data base itself there is potential to refine analyses to reveal meaningful patterns. Our data may also suggest improvements in the kind of "doctor-lawyer index," a simple compilation of all combinations of doctors and lawyers appearing on bodily injury cases, currently maintained by CAR. In particular, geographic patterns should be explored. To what extent can relatively high loss rates for various communities be explained by high-volume practitioners?
Similarly, the Lawrence claims should be explored in more depth. Can we relate Lawrence-type claims to the general taxonomy we hope to develop? If so, is there evidence of a smaller scale or incipient Lawrence phenomenon in other communities?

Finally, our data should be useful in evaluating the effects of the recent change in the tort threshold. By adjusting medical expenses and lost wages to account for inflation since the 1985–1986 period covered by the study, we can predict the losses which would have occurred for 1989 claims in the absence of the change. The actual losses can then be compared against this baseline estimate. To implement this approach, data from a sample of approximately 1,500 BI liability claims from accident-year 1989 were collected in the fall of 1990. Fully comparable data allowing for at least three years of loss development will not be available until around 1993, but a useful preliminary indication is expected shortly.
Introduction


Public dissatisfaction with the costs and availability of personal automobile insurance has led to an ever expanding diversity of insurance compensation systems. States are experimenting with tort liability systems vs. no-fault systems, monetary thresholds vs. verbal thresholds, prior approval rate regulation vs. open competition, assigned risk plans vs. joint underwriting facilities, and numerous types of restrictions on classification schemes and territorial relativities. Insurance officials and industry personnel face a bewildering array of regulatory systems as they attempt to choose the best elements of each of them.

This variety is good. Public policy advocates provide rose-colored views of their desired reforms. But a state legislator must ask: "In practice, do such reforms fulfill the promises that they make?"

Objective analyses of automobile compensation systems are essential for insurance regulators and private carriers, though in the flurry of public debate, thoughtful reviews are hard to find. The three exemplary studies, by Professors Harrington, Pritchett, and Niehaus, of automobile insurance regulatory systems or proposed reforms in Michigan, California, and South Carolina, fulfill this need, showing the reader how different compensation systems affect insurance cost and availability in several jurisdictions.

No-Fault Compensation Systems

Professor Harrington's comprehensive study of the Michigan regulatory system is reprinted here because of its continuing importance for the design of no-fault compensation systems and automobile classification schemes; the other two studies may be found in the original JIR volumes. Michigan has the unique distinction of having
the nation's strongest no-fault system and yet one of the most con-
strained classification schemes. Indeed, Michigan's insurance sys-
tem is the exemplar of cost-effective compensation systems and the
anathema of competitive rating systems. Professor Harrington's
study tour apart these elements of the Michigan system, showing the
advantages and drawbacks of each, and proposing additional
changes—for both the classification systems and for the no-fault
compensation system—to further promote the public welfare.

No-fault: compensation systems provide first party reim-
bursement for economic damages to the injured automobile accident vic-
tim. In exchange, the accident victim gives up his or her right to sue
in tort for the damages incurred. Workers' compensation illustrates a
"pure" no-fault system: suits by an employee against an employer
for occupational injuries are disallowed. For automobile insurance,
no state presently has a "pure" no-fault system. Rather, in each no-
fault state, there is a "tort threshold." If damages from the automo-
bile accident exceed the tort threshold, then the accident victim may
bring a bodily injury suit against the at-fault driver. The objective of
the tort threshold is to eliminate claims for minor injuries, which
are adequately compensated by no-fault coverage, but allow claims
for more serious injuries, where "pain and suffering" damages are
substantial. Ideally, no-fault compensation systems provide quicker,
more equitable, and more adequate payments to accident victims
while reducing overall claim costs.

Most no-fault states have a "monetary" tort threshold, which
says that if medical damages exceed a certain dollar amount, a bodily
injury suit may be brought. Monetary thresholds have two short-
comings:

• First, inflation erodes the fixed dollar amount, making it more
likely each year that damages will exceed the threshold.

• Second, a fixed dollar amount may serve as a "target," encour-
aging claimants, attorneys, and medical practitioners to "pad"
claims in order to exceed the threshold. In many situations,
this raises overall system costs instead of reducing them.1

1. The papers in this volume by Wosberg, Deetz, and Matter show the det-
erruous effects of the monetary threshold on automobile claim costs in Massachu-
setts.
Three states, Michigan, New York, and Florida, have "verbal" thresholds. Bodily injury suits may be brought in these states only if the accident causes specified types of severe injury, such as "permanent disfigurement." Of the three verbal thresholds, Michigan's has been most effective in eliminating suits for minor injuries, such as sprains and strains of the back and neck, which have proliferated in almost every other state in the nation.

In two other respects, as noted by Professor Harrington, Michigan's no-fault system provides incentives for increasing costs:

- First, a recent Michigan Supreme Court decision has liberalized the interpretation of the verbal threshold, allowing more bodily injury suits to be brought.
- Second, Michigan's no-fault system provides unlimited medical benefits, at a substantial cost to auto insurance policyholders. The almost unrestricted coverage of medical payments encourages accident victims to seek high-quality, expensive, and perhaps unnecessary treatment.

In all three of these papers, Professor Harrington offers public policy recommendations, which are noteworthy for their emphasis on the intelligence of the citizenry and on the public's right to choose the insurance coverage which it will purchase. The state mandated coverages and benefits often proposed by other public policy advocates implicitly assume a paternalistic view of government. Harrington, in contrast, recommends that the state provide various options, but that each citizen be allowed to choose the coverage that he or she desires. For instance, no-fault coverage might come in three varieties:

- Unlimited medical coverage (as exists now).
- Medical coverage limited by some maximum (such as $250,000 per accident).
- Excess medical coverage (such as coverage only for costs in excess of $250,000 per accident).

Let motorists have the choice among these options, says Harrington. Unlimited medical coverage is exceedingly expensive, though it is needed in only rare instances. Poor people, who find current automobile premiums to be unaffordable and who would be
covered by Medicaid (or other social insurance programs) for catastrophic accidents, would choose limited medical coverage. In contrast, persons with adequate employer provided group health insurance programs have no need for basic no-fault coverage. They would purchase excess coverage only, again reducing the system's costs.

The reasonableness of Professor Harrington's recommendations, their adaptability to various regulatory systems, and their potential for reducing automobile insurance costs make them powerful tools for promoting the public welfare. State insurance departments and legislatures look to casualty actuaries to estimate the cost implications of various regulatory systems, particularly when statutory reforms are accompanied by rate rollbacks. Actuaries should pay close scrutiny to these studies by Professors Harrington, Pritchett, and Nichaus, to see how the compensation system affects expected claim costs.

Underwriting Restrictions and Involuntary Markets

Automobile insurance claim costs vary greatly by driver characteristics, such as age, sex, marital status, and driving record, and by location (or "territory"). Premium rates vary enormously; the cost of auto insurance may be ten times as great for a young, unmarried male living in an inner city as it is for a middle-aged, married female living in a rural area.

Factors such as age, sex, and marital status of the driver, or the garaging location of the automobile, do not "cause" automobile accidents. Rather, they are proxies for the true underlying factors that affect auto insurance costs. For instance, the young, unmarried male may be a more carefree and reckless driver than a mother of young children is. Similarly, accident victims living in metropolitan areas are more likely to hire attorneys and to press insurance claims even for minor injuries than are residents of rural areas.

The several states differ in their approaches to auto insurance rate classification. Some states permit insurers to classify applicants based on actuarial estimates of expected cost. Other states, responding to "affordability" problems or to "social equity" problems, restrict the use of certain rating variables, such as sex, age, marital status, and territory.
Michigan, South Carolina, and California all place severe restrictions on automobile insurance classification variables. Certain variables are entirely prohibited, such as sex and marital status of the driver. Other variables, such as territory, have more complex restrictions. In Michigan, for instance, there were restrictions on the permissible rate differentials between contiguous territories and between the highest and lowest rated territories. The paper by Harrington and Niehaus discusses a California proposal to vary the permissible rate of return according to the volume of business the insurer handles in "under-served" areas of the state.

The conclusion of all three papers is clear: regulatory restrictions on insurance risk classification do more harm than good. Prohibiting certain classification variables, or leveling premium rates by territory, creates subsidies for high-risk drivers, and these subsidies must be funded by the rest of the driving population. In all three states, the involuntary market population is already high or is growing rapidly, because of the inadequate voluntary market rates for certain driver classifications and the suppressed involuntary market rates for these classifications.2

Harmful regulation elicits more public resentment which spawns more harmful regulation. Professors Harrington, Pritchett, and Niehaus take a Western economic perspective to insurance pricing. In general, social welfare is optimized by the unlettered distribution of goods and services in free markets. Oppressive insurance regulation, whether of rates of return, classification systems, or involuntary market rates, begets more dissatisfaction, which leads to calls for more state regulation.

These subjects—rates of return, classification systems, and rate adequacy—are the purview of the casualty actuary. Actuaries must understand not only the statistical techniques that they have traditionally used in each of these areas. They must also understand the manifold social problems and regulatory "solutions" in the various states, so that they can help weed out the pernicious ones and promote the beneficial ones.

2. See also the papers by Judith Matsel in this volume on the competitive effects of suppressed involuntary market rates combined with inadequate voluntary market rates for high-risk drivers.
Auto Insurance in Michigan

Regulation, No-fault, and Affordability

Scott E. Harrington

Abstract

This report evaluates the private passenger auto insurance market in Michigan. It analyzes the nature and causes of affordability problems, the benefits and costs of the system of auto insurance regulation mandated by the Essential Insurance Act, and the performance of the state's no-fault law. The analysis suggests that additional restrictions on underwriting and rate classification should be avoided. Instead, consideration should be given to allowing more discretion in underwriting and classification to provide insurers and policyholders with better incentives for controlling claim costs. The analysis also suggests that the state's no-fault system could be improved by allowing policyholders significant choice in the selection of personal injury protection levels and by taking steps to ensure that the liability for noneconomic loss is restricted to serious injuries.

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Introduction

This report evaluates the private passenger auto insurance market in Michigan. It suggests appropriate government policies for dealing with auto insurance affordability problems and for improving the auto insurance system to benefit Michigan motorists. The report considers: 1) the nature and causes of affordability problems, 2) the benefits and costs of the current system of auto insurance regulation as set forth under the Essential Insurance Act, and 3) the performance of the state’s no-fault law.

Overview of Automobile Insurance In Michigan

Types of Coverage

Under the Michigan no-fault law, which was effective October 1, 1973, all auto owners are required to purchase personal injury protection ("PIP") coverage, property protection insurance, and residual liability coverage. PIP insurance provides the most comprehensive first-party benefits of any no-fault law. It covers medical and rehabilitation expenses without limitation and provides a maximum of three years of coverage for wage loss and survivor benefits. The law limits tort liability to economic losses in excess of PIP-benefit-limits and provides for tort liability for noneconomic losses only if a verbal threshold is satisfied. The restriction on tort claims for noneconomic loss historically has been the most effective in the nation.

Property protection insurance provides up to $1 million in coverage for property damage by the insured on a no-fault basis. It does not cover the insured’s property or damage to autos unless those autos are legally parked at the time of the accident. In contrast to almost all other states with no-fault, Michigan’s no-fault law limits tort liability for property damage to other autos. Until July 1, 1980, tort liability was completely eliminated. In 1980, drivers became subject to tort liability for up to $400 in damage to other vehicles if the loss was not covered by insurance. A driver who is more than 50 percent at-fault cannot recover under this "mini-tort" provision. Residual liability coverage must be purchased with minimum limits of $20,000 per person and $40,000 per occurrence for bodily injury and
$10,000 per occurrence for property damage. Auto owners have the option of purchasing comprehensive coverage for theft and damage either by collision and/or standard, broad, or limited collision coverage. The purchase of uninsured and underinsured motorists coverage also is optional.

**Regulation**

Michigan's system of auto insurance regulation has several unusual features. The Essential Insurance Act, which was enacted in 1979 and became effective on January 1, 1981, places a3 significant limitations on underwriting and rate classification by insurers. All auto insurers must offer coverage (including PIP, property protection, residual liability, comprehensive, and collision) to any "eligible person" who also meets their underwriting rules (which must be filed with the insurance Bureau). Each person is eligible unless he or she has recently been convicted of insurance fraud or some serious motor vehicle violation, has been canceled recently for nonpayment of premium, or has accumulated more than six points for accidents and/or motor vehicle violations in the past three years. Insurers need not offer coverage to ineligible persons or to eligible persons who do not meet their underwriting criteria. Allowable underwriting criteria (which must be uniformly applied) only include the factors that define an eligible person and several other factors that are specifically set forth in the law, such as use of the auto for commercial purposes, modifications to increase speed, or the points accumulated by another driver in the insured's household who accounts for 10 percent or more of the use of the insured vehicle.

1. Property damage liability covers Michigan drivers involved in accidents out of state.
2. Standard collision pays for damages above a deductible, regardless of whether the insured or other driver is at fault. Broad collision only includes a deductible if the insured is more than 50 percent at fault. Limited collision only provides coverage if the insured is not more than 50 percent at fault. For additional background on auto insurance coverages and the auto insurance market and regulation in Michigan, see MICHIGAN INSURANCE GUIDE HANDBOOK (1999).
3. The Essential Insurance Act deals with both auto and homeowners insurance. The present study focuses exclusively on auto insurance, and the discussion concentrates on private passenger auto insurance.
4. For example, conviction for speeding 16 or more miles per hour over the limit produces four points, the first substantially at fault accident produces three points, and subsequent at-fault accidents produce four points each.
Voluntary market rates are subject to a file-and-use rating law. Insurers need not obtain approval of rates prior to their use. However, insurers may only employ rating criteria that are specified by law. The principal criteria allowed include age or driving experience, driver "primacy," average mileage, commuting mileage, type of use, vehicle characteristics, number of cars or licensed operators, and amount of insurance. Insurers must also establish merit rating plans that provide surcharges for substantially at-fault accidents and for motor vehicle violations. Rates cannot be based on the owner's or driver's gender or marital status. The Essential Insurance Act also contained significant restrictions on the use of territorial rating. As discussed in detail later in the paper, these restrictions proved to be unworkable and were substantially modified in 1986.

The Essential Insurance Act changed Michigan's involuntary market for auto insurance from an assigned risk plan to a joint underwriting association (the Michigan Automobile Insurance Placement Facility or "MAIPF"). The law requires that the five largest auto insurers and up to five additional insurers operate as servicing carriers. Rates for the MAIPF are subject to prior approval by the insurance commissioner. As will be discussed later, the law places specific restrictions on MAIPF rates in higher-rated territories. MAIPF operating losses are assessed against all insurers in proportion to their voluntary market volume. Only a small number of states impose significant restrictions on auto insurance underwriting and rate classification. Among these states, Michigan's system of regulation is distinctive in that it employs file-and-use regulation rather than prior approval for overall voluntary market rate levels. In contrast to Michigan, other states with substantive limitations on underwriting and rate classification employ a reinsurance facility or similar mechanism that permits insurers to pool the financial results of any insured with other insurers in the state.

5. Before 1981, insurers could choose between prior approval regulation of rates and a file-and-use system that allowed the commissioner to order refunds if rates filed under the file-and-use provision were later found to be excessive. Most insurers submitted rates for prior approval.

6. This distinction is important in understanding the problems that arose from the Essential Insurance Act's restrictions on territorial rating.
Magnitude and Growth in Premiums and Losses

The magnitude and growth in auto insurance premiums and claim costs in Michigan and other states are examined in this section to provide useful background on the nature and causes of affordability problems, including the average cost of coverage in Michigan compared to other states, the performance of Michigan's no-fault law, and the magnitude of claim costs in Detroit relative to statewide claim costs. Given competition in the Michigan auto insurance market, the magnitude and growth in premiums will reflect primarily the magnitude and growth in the frequency and severity of claim costs, which are influenced by factors such as the rate of growth in the cost of medical treatment and auto repair parts, changes in the accident rate, and changes in legal rules governing liability for auto accidents.

Table 1 shows the average private passenger auto premium for all coverages combined per insured vehicle for Michigan and selected additional states in 1982 and 1987 along with the percentage change between 1982 and 1987. The average premium in Michigan was $486 in 1987 compared to a countrywide average of $514. Michigan's average premium ranked 22nd in 1987, down from 19th in 1982. The average premium in Michigan grew by 49 percent between 1982 and 1987 compared to a countrywide rate of 56 percent. Its growth rate was the 32nd highest in the nation.

Figure 1 shows the average premium per insured vehicle in Michigan for PIP coverage, for residual liability coverage which is

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7. Insured vehicles are the number of liability insurance written car-years during the year. These data, along with data on passenger car registrations, are available from the Automobile Insurance Plans Service Office (AIPSO). Circular RMC 89-14 (April 14, 1989) and AIPSO Facts. Premium comparisons published by the A.M. Best Company are based on vehicle registrations rather than insured vehicles. Michigan's average premium in 1987 was $500 and ranked 17th among the states using the A.M. Best procedure. The reason that the average premium is lower using insured car-years is that the number of passenger car registrations in 1987 was 5,440,887 compared to 5,705,596 insured car-years (see AIPSO Circular RMC 89-14). A problem with both approaches is that states vary widely in their definitions of private passenger vehicle registrations. For example, some states exclude vans and pickup trucks from the registered vehicle data, the number of insured vehicles often exceeds the number of registrations. Similarly, the use of registered vehicles will not reflect differences across states in the number of uninsured cars. For these reasons, it is probably better to compare premiums per insured vehicle across states. Also see Note 6 infra.
<table>
<thead>
<tr>
<th>Rank</th>
<th>State</th>
<th>Average Premium 1987</th>
<th>Average Premium 1992</th>
<th>Percent Growth 1982-87</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>New Jersey</td>
<td>$744</td>
<td>$529</td>
<td>96%</td>
</tr>
<tr>
<td>2.</td>
<td>California</td>
<td>717</td>
<td>453</td>
<td>79%</td>
</tr>
<tr>
<td>3.</td>
<td>D.C.</td>
<td>709</td>
<td>444</td>
<td>75%</td>
</tr>
<tr>
<td>4.</td>
<td>Massachusetts</td>
<td>655</td>
<td>423</td>
<td>74%</td>
</tr>
<tr>
<td>5.</td>
<td>Connecticut</td>
<td>634</td>
<td>421</td>
<td>72%</td>
</tr>
<tr>
<td>22.</td>
<td>Michigan</td>
<td>486</td>
<td>327</td>
<td>49%</td>
</tr>
<tr>
<td>47.</td>
<td>Idaho</td>
<td>322</td>
<td>217</td>
<td>34%</td>
</tr>
<tr>
<td>48.</td>
<td>Iowa</td>
<td>285</td>
<td>213</td>
<td>28%</td>
</tr>
<tr>
<td>49.</td>
<td>South Dakota</td>
<td>273</td>
<td>212</td>
<td>25%</td>
</tr>
<tr>
<td>50.</td>
<td>Nebraska</td>
<td>272</td>
<td>209</td>
<td>24%</td>
</tr>
<tr>
<td>51.</td>
<td>North Dakota</td>
<td>768</td>
<td>192</td>
<td>22%</td>
</tr>
<tr>
<td></td>
<td>Countrywide</td>
<td>514</td>
<td>331</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>Median State</td>
<td>489</td>
<td>286</td>
<td>51%</td>
</tr>
</tbody>
</table>

denoted bodily injury liability in the figure, and for physical damage (comprehensive and collision) coverage during 1980–87. Figure 2 shows the average incurred loss per insured vehicle during the same period.8

In 1988, physical damage coverage accounted for 56 percent of total private passenger auto insurance premiums in Michigan. The average physical damage premium per vehicle grew by 63 percent from 1980 to 1987. The average loss grew by 67 percent.9 PIP pre-

8. The written premium and incurred loss data were obtained from Best’s Executive Data Service. Incurred losses are calendar-year values. They equal paid losses plus the change in the loss reserve. Insured vehicles are again defined as liability insurance written car years. Data on physical damage exposures are not available. As a result, the physical damage results will be affected by any change over time in the proportion of cars that are insured for liability but not physical damage.

9. Total physical damage premiums declined slightly during 1988, while total
mumms represented 25 percent of total premiums in 1988. The average PIP premium grew by 69 percent during 1980–87. The average loss grew by 263 percent. Much of this growth is attributable to increases in losses for the Michigan Catastrophic Claims Association, which provides coverage for all PIP claims for medical and rehabilitation expenses in excess of $250,000 per injured person.10 Residual liability premiums represented 20 percent of total premiums in 1988. Residual liability premiums and incurred losses (the vast majority of which are for bodily injury liability coverage) increased by 28 and

physical damage losses increased slightly. Liability premiums increased slightly in 1988; PIP premiums grew by 6 percent.

10 Due largely to discounting of PIP loss reserves by a number of insurers, total reported PIP incurred losses declined by 31 percent in 1988.
14 percent, respectively, during 1980–87. After declining in 1985 and 1986, the average residual liability premium increased sharply in 1987.

Table 2 presents information on the level of frequency, severity, and average cost per vehicle of paid claims in Michigan and countrywide for the year ending June 1989. Table 3 presents analogous information on the growth in paid claim costs since 1985. As can be seen in Table 2, the frequency of paid claims for bodily injury liability is much lower in Michigan than countrywide, and the severity of paid claims is much higher. Both differences reflect the operation of Michigan’s restrictions on tort liability. Claims for minor injuries are removed from the tort system. As a result, the average paid claim cost per vehicle also is much lower in Michigan. The severity and average cost per vehicle of PIP paid claims are much higher in Michigan than countrywide. The major reason for these differences is that Michigan’s PIP benefits are much more comprehensive than those in most other states with no-fault. The Michigan system of no-fault property damage lead to much smaller claims for property damage and correspondingly higher claims for collision coverage than countrywide. For comprehensive coverage, Michigan’s claim frequency and average cost per vehicle are higher than the countrywide results.

11. The greater growth rate for premiums is likely to have been influenced by the reduction in interest rates that occurred between 1980 and 1986. Other things being equal, reduction in interest rates lead to increase premiums because insurers will earn less investment income below claims are paid. The greater the average length of time between the receipt of premiums and the payment of claims, the greater will be the premium increase. Hence, interest rates are likely to have a greater impact on liability premiums than on physical damage premiums.

12. As shown in the note to Table 2, claim frequency is defined as the annual number of claims per 10 insured vehicles. Claim severity is the average paid cost per claim. The average claim cost per vehicle is total annual claim costs divided by the number of vehicles.

13. The bodily injury paid claim frequency and average paid claim cost per vehicle also are lower, and the severity of paid claims is higher in Michigan than the average for other states with no-fault laws due to the greater effectiveness of Michigan’s tort threshold in eliminating tort liability for minor injuries.

14. The countrywide numbers only reflect states with PIP coverage.

15. If the sum of the results for property damage liability and collision in Michigan is compared to the countrywide sum for property damage liability and collision, the frequency of claims is about the same, and the average cost per vehicle is higher in Michigan.
### TABLE 2
Percentage Growth in Frequency, Severity, and Average Cost of Paid Claims for Four Quarters Ending in June 1989: Michigan vs. Countrywide

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Michigan</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Claim Frequency</td>
<td>Claim Severity</td>
<td>Average Cost Per Vehicle</td>
<td>Claim Frequency</td>
<td>Claim Severity</td>
<td>Average Cost Per Vehicle</td>
<td></td>
</tr>
<tr>
<td>1. Bodily Injury Liability</td>
<td>.28</td>
<td>$17,390</td>
<td>$47.97</td>
<td>1.28</td>
<td>$7,406</td>
<td>$94.60</td>
<td></td>
</tr>
<tr>
<td>2. Personal Injury Protection Liability</td>
<td>1.26</td>
<td>7,144</td>
<td>89.90</td>
<td>1.87</td>
<td>2,637</td>
<td>49.35</td>
<td></td>
</tr>
<tr>
<td>3. Property Damage Liability</td>
<td>.62</td>
<td>742</td>
<td>4.61</td>
<td>4.10</td>
<td>1,338</td>
<td>54.91</td>
<td></td>
</tr>
<tr>
<td>4. Collision</td>
<td>12.78</td>
<td>1,445</td>
<td>184.97</td>
<td>8.03</td>
<td>1,414</td>
<td>113.66</td>
<td></td>
</tr>
<tr>
<td>5. Comprehensive</td>
<td>11.56</td>
<td>571</td>
<td>66.01</td>
<td>9.42</td>
<td>584</td>
<td>55.02</td>
<td></td>
</tr>
<tr>
<td>6. Property Protection</td>
<td>.76</td>
<td>791</td>
<td>5.98</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td></td>
</tr>
</tbody>
</table>

Note: Claim frequency is number of paid claims per 100 insured vehicles. Claim severity is total paid claims divided by number of paid claims. Average cost per vehicle is total paid claims divided by number of insured vehicles. All values are averages of quarterly results for last two quarters of 1988 and first two quarters of 1989.

Source: Fast Track Monitoring System. Calculations by the author.
<table>
<thead>
<tr>
<th>Coverage</th>
<th>Claim Frequency Michigan</th>
<th>Claim Severity Michigan</th>
<th>Average Cost Per Vehicle Michigan</th>
<th>Claim Frequency Countrywide</th>
<th>Claim Severity Countrywide</th>
<th>Average Cost Per Vehicle Countrywide</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bodily Injury Liability</td>
<td>4.2%</td>
<td>24.5%</td>
<td>29.9%</td>
<td>17.8%</td>
<td>35.8%</td>
<td>59.8%</td>
</tr>
<tr>
<td>2. Personal Injury Protection</td>
<td>−5.3%</td>
<td>57.0%</td>
<td>48.5%</td>
<td>10.2%</td>
<td>33.5%</td>
<td>47.1%</td>
</tr>
<tr>
<td>3. Property Damage Liability</td>
<td>14.8%</td>
<td>9.9%</td>
<td>26.6%</td>
<td>−5.3%</td>
<td>37.5%</td>
<td>30.8%</td>
</tr>
<tr>
<td>4. Collision</td>
<td>−4.3%</td>
<td>38.0%</td>
<td>32.1%</td>
<td>−6.8%</td>
<td>35.3%</td>
<td>26.2%</td>
</tr>
<tr>
<td>5. Comprehensive</td>
<td>2.8%</td>
<td>−15.5%</td>
<td>−13.0%</td>
<td>8.2%</td>
<td>19.9%</td>
<td>29.9%</td>
</tr>
<tr>
<td>6. Property Protection</td>
<td>−23.2%</td>
<td>35.0%</td>
<td>3.1%</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>

Note: Values are percentage changes between four-quarter averages ending June 1989 and June 1985.

Source: Fast Track Monitoring System
Table 3 indicates that auto liability paid claim cost frequency, severity, and average cost per vehicle in Michigan grew at a slower rate between 1985 and 1989 than in the rest of the country. As discussed below, however, bodily injury claim frequency has begun to increase since 1986, following a period of declining frequency in 1985 and 1986. The growth of PIP claim severity in Michigan is much greater than the growth in nationwide PIP severity. As a result, the growth in the average cost of PIP claims was about the same as the nationwide growth rate despite the fact that PIP claim frequency declined in Michigan and grew by 10 percent nationwide since 1985. Again, the larger value for severity in Michigan reflects its greater level of PIP benefits.

The average cost of comprehensive claims in Michigan has decreased since 1985 despite a small increase in frequency. The major cause of this decline is likely to have been a reduction in auto thefts during the past several years (see below). Since auto thefts have higher severity than other comprehensive claims, the reduction in severity since 1985 is consistent with a reduction in the proportion of comprehensive claims represented by theft claims.

In general, auto insurance claim costs and thus premiums are significantly higher in large urban areas than in smaller cities and rural areas. Table 4 shows ratios (in percent) of incurred loss frequency, severity, and average cost per vehicle in Detroit to statewide results for the period 1985-88. As can be seen, claim frequency, se-

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Frequency</th>
<th>Severity</th>
<th>Average Cost per Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bodily Injury Liability</td>
<td>138%</td>
<td>103%</td>
<td>143%</td>
</tr>
<tr>
<td>Personal Injury Protection</td>
<td>144</td>
<td>113</td>
<td>163</td>
</tr>
<tr>
<td>Broadened Collision</td>
<td>128</td>
<td>107</td>
<td>138</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>190</td>
<td>165</td>
<td>248</td>
</tr>
</tbody>
</table>

Note: Five-year values for Detroit divided by five-year values statewide, in percent.
Source: ISO and NAII, Factors Affecting Urban Auto Insurance Costs, 1988
verity, and average cost per vehicle are uniformly higher in Detroit than for the entire state.16 The ratios of Detroit severity to statewide severity are much smaller than those for frequency, except for comprehensive coverage, in which case the much higher severity in Detroit is most likely attributable to the higher vehicle theft rate. As a result of much greater frequency and severity, the average cost per vehicle of comprehensive claims in Detroit is two and a half times the statewide average. The results shown in Table 4 were obtained from a study of claim costs in 18 large cities that was conducted by the Insurance Services Office, Inc. ("ISO") and the National Association of Independent Insurers ("NAII"). Of these 18 cities, Detroit's ratio for the average cost per vehicle of comprehensive claims was the fifth largest during 1983-88 (behind New York, Newark, Boston, and Philadelphia).17 The ratio of thefts per 100,000 population in Detroit to that for the entire state was the third largest of the 18 cities studied by the ISO and NAII (behind Newark and Boston). In 1987, the motor vehicle theft rate in Detroit was 2,732 per 100,000 population compared to a statewide rate of 753 per 100,000. The 1987 theft rate in Detroit was much lower than the 1985 rate of 3,452 per 100,000 population, and the ratio of the theft rate in Detroit to the statewide theft rate declined from 417 percent in 1985 to 360 percent in 1987.18 Since the ISO/NAII analysis was based on aggregate data for 1983-88, the ratios for comprehensive coverage shown in Table 4 are likely to overstate the difference that existed at the end of this period.

In addition to the higher premiums in Detroit for comprehensive and other forms of coverage due to higher claim frequency and severity, affordability problems in Detroit are aggravated by the low per capita income of many residents.19 As a result, the affordability

16. Of course, the ratio of Detroit results to those for areas outside of Detroit would be higher than the values shown in Table 4.
17. See ISO and NAII, FACTORS AFFECTING URBAN AUTO INSURANCE COSTS (1988). Detroit's ratio for the average cost per vehicle for bodily injury liability claims ranked 11th of the 18 cities.
18. These data were obtained from MICHIGAN INSURANCE BUREAU, AUTO THEFT IN MICHIGAN: A REPORT TO THE LEGISLATURE (Aug., 1989). This report provides detailed information about the auto theft problem. In 1984, Michigan had the highest auto theft rate of any state. In 1987, Michigan's theft rate was the fifth highest in the nation.
19. For evidence of low per capita income in many areas of Detroit, see MICHIGAN INSURANCE BUREAU, AUTO INSURANCE RATING IN MICHIGAN: THE EFFECTS OF
problems in Detroit is acute for many motorists, regardless of the fact that the statewide average premium in Michigan and average premium growth are lower than countrywide.

The Essential Insurance Act

Background and Rationale

The basic arguments for restrictions on insurer underwriting and rate classification that ultimately were enacted in the Essential Insurance Act of 1981 are set forth in a 1977 report to the Governor by the Michigan Insurance Bureau.20 This report argued that auto insurance is essential in modern life and that government must ensure that coverage is available to all citizens. It argued that the auto insurance market was characterized by pronounced availability problems and suggested that an availability crisis was imminent without substantial government action. In support, it referred to a rapid increase in the number of applications to the Michigan assigned risk plan in 1976. It also suggested that availability problems were widespread, although somewhat less dramatic, in other states including the nearby states of Illinois and Ohio.21

Specific criticisms of the auto insurance market that are contained in the 1977 report include:

1. The principal form of competition in insurance involved attempts by insurers to underwrite the best risks and avoid risks that were perceived as undesirable.

PUBLIC ACT 10 OF 1986 at 95-96 (Nov., 1989). This report provided some evidence of greater premium growth in Detroit than statewide since 1986. The analysis and conclusions concerning territorial rating that are contained in this report are examined in the next section.


21. The discussion in the report was not clear as to whether widespread problems existed for auto insurance, for urban property insurance, or both.
2. Insurer underwriting decisions and rate classification were subjective, arbitrary, and unfairly discriminatory. Insurers lacked the technical ability to identify differences in risk across individuals with sufficient accuracy. Existing regulation was inadequate to deal with these problems.22

3. As a result of subjective, arbitrary, and unfairly discriminatory underwriting and rate classification, large numbers of drivers were forced into the involuntary market, which was characterized by higher premiums and lower service quality. This situation was inequitable, because many of these drivers were "objectively" similar to drivers insured in the voluntary market.23

4. The insurance market provided only limited choice to consumers, since they could be denied coverage by the insurer of their choice.

The report argued that the objectives of regulation should be to guarantee the right to essential coverage, to guarantee "competitive and fair" rates, to provide freedom of choice to consumers, and to be cost effective. The report defined competitive rates as those that in the aggregate would not produce excessive profits. Fair rates were defined as those based only on objective factors that were both largely within the ability of the insured to control and causally related to losses.

To meet these objectives, the Essential Insurance Act of 1977 was proposed by the Insurance Bureau.24 This proposal had four main features. First, insurers would be required to accept all applicants for coverage. Second, rate classification would be subject to greater government control to ensure fairness. Third, overall rate levels would be determined by competition under a file-and-use system of rate

22. The report criticized a section in the insurance code that allowed insurers to use any classification scheme that "may produce differences among risks and that may have a probable effect on losses or expenses."  

23. The report also noted that availability problems were aggravated by cyclical fluctuations in insurance prices and in the supply of coverage and that cancellations of policies and denials of coverage generally created difficulties for some drivers. Many states adopted legislation in the 1970s that specified allowable reasons for insurer cancellation of auto and homeowners coverage. A few states also limited the ability of insurers to deny renewal of coverage.

24. See ESSENTIAL INSURANCE IN MICHIGAN, Note 20 supra at Part 5.
regulation. Fourth, a reinsurance facility would be created, and in-
surers would have the discretion of reinsuring any insured in the
facility. The key details, analysis, and suggested program of regula-
tion set forth in the Insurance Bureau's 1977 report were identical
to those contained in a report prepared by the Federal Insurance Ad-
ministration in the early 1970s. Major facets of this program had
been adopted in Massachusetts, North Carolina, and South Carolina
in the mid-1970s, with the principal exception that none of these
states allowed insurers to change rates without prior approval by
regulators.

The Shavers Decision

The Insurance Bureau's 1977 reform program was not enacted by
the legislature. In June, 1978, the Michigan Supreme Court issued its
decision on the constitutionality of the state's no-fault law. The
Court's four-to-three decision in Shavers v. Attorney General25 up-
held the right to limit tort liability for bodily injury liability. How-
ever, in contrast to lower court decisions, it held that no-fault prop-
erty damage was constitutional.26 More important, it held that
compulsory no-fault coverage violated due process and was thus un-
constitutional because insurance regulation failed to ensure that
coverage would be available at "fair and reasonable" rates.

In order to satisfy due process, the Court held that it would be
necessary to give substantial meaning to the statutory requirement
concerning rate levels that is, that rates be adequate but not exces-
sive or unfairly discriminatory, to clearly identify rating factors and
rate differentials and disclose such factors to consumers, and to pro-
vide prompt administrative review to consumers who desired to
challenge underwriting or rating decisions. The court provided 18

25. See Report of the Federal Insurance Administration to the Secretary, De-
Also see the discussion by Day and Cabot, The Michigan Essential Insurance Act-
27. The initial Shavers case was filed in 1971 before the effective date of no-
fault. Both the trial court and the Court of Appeals held that compulsory PIP coverage and the restrictions on tort liability for bodily injury were constitutional, but that no-
fault property damage was unconstitutional.
months for the legislature and Insurance Commissioner to act before the no-fault law would become unconstitutional. 28 The Essential
insurance Act, with its restrictions on insurers underwriting and rating and detailed provisions allowing policyholders to review rates and
late factors, was enacted by the legislature in 1979 prior to the end
of the 18-month period specified in Shawver.

Critique of the Rationale for the Act

The 1977 report by the Insurance Bureau and the earlier work by the
Federal Insurance Administration exaggerated problems in the ins-
surance market and did not devote sufficient attention to the bene-
fits of competitive underwriting, risk classification, and claim set-
tlement. Substantial restrictions on underwriting and rating adopted
in the Essential Insurance Act and in other states have significant
drawbacks. 29

Competitive Underwriting and Risk Classification

The probability and likely cost of damages from an accident will depend on
factors such as traffic density, road conditions, the cost of hospitaliza-
tion, and the cost of vehicle repair parts. They also will be affected

28. In its discussion of the constitutionality of no-fault, the court noted that
it would be acceptable for the state to fix rating plans and rate differentials, to prohibit
collusion and marketpower, and to restrict other insurer company underwriting
practices to ensure availability. The discussion was broad enough to make it clear
that the type of restriction suggested in the Insurance Bureau’s 1977 report would be
acceptable. The 1977 report was referenced in the minority opinion. Three justices
dissented from the majority in sharply worded opinions. The major objections were
that the issue of compulsory coverage and insurance rate regulation had not been
brought before the court and that no factual record existed concerning those matters.

29. See Leos and Calero, Note 25 supra, and Wexler, Note 20 supra, for dis-
cussion of Michigan. For general discussion and discussion of particular states, see
Schhuha, Problems of Insurance Availability—Redlining, 25 C.P.C. 1. 139
25 (March, 1981); U.S. General Accounting Office, Auto Insurance State Reg-
sulations: Effects of Cost and Availability (1986); Matier, New Jersey’s Regulatory Pol-
icy for Auto Insurance, 3 J. Ins. Reg. 38 (1986); Scott Honsinger, “Rate Regulation,
No-fault, and the Automobile Insurance Affordability Problem,” College of Business
Administration, University of South Carolina (Jan. 1984); Harrington and Pritchett,
Auto Insurance Reform in North Carolina, 8 J. Ins. Reg. 442 (1990); Sevin Rotton-
Rate-Setting in Massachusetts (1989).
by the precautions taken by persons to avoid accidents and to reduce the cost of accidents that do occur, including any tendency to create fraudulent losses, inflate claim costs following an accident, or both. The major economic justification for allowing insurers substantial discretion in underwriting and risk classification is that it provides incentives for drivers and insurers to control claim costs efficiently.\footnote{As noted by Schulte, note 29, supra, risk assessment constitutes the very heart of the private insurance market.}

Competitive pressure and policyholder preferences provide insurers with the incentive to sort policyholders into the most homogeneous groups possible subject to constraints on the availability and cost of information. The desire by policyholders for the lowest possible premium creates the incentive for insurers to reduce rates for drivers with lower-than-average expected accident costs. As a byproduct, premiums for drivers who on average will have higher accident costs will increase. Any insurer that did not engage in risk classification to sort policyholders into the most homogeneous groups possible would lose customers with lower-than-average expected costs to competitors, attract customers with higher-than-average expected costs, or both. The insurer would need to raise rates, engage in classification, or both to survive.

Competitive risk assessment cannot produce perfect accuracy in the sense that each policyholder pays a premium exactly commensurate with expected loss, but it will produce the greatest possible accuracy given the cost of information and inherent constraints on information. The resultant system of “cost-based pricing” has a persistent tendency to achieve two related results over time: First, in any rating class it will not be possible \emph{ex ante} to distinguish drivers with higher-than-average expected accident costs from drivers with lower-than-average expected accident costs at a cost that would justify obtaining the information necessary to do so (assuming that such information existed). Second, actual losses will differ significantly between rating classes, but on average it will not be possible \emph{ex post} to identify subgroups \emph{within} a class that have experienced significantly different losses, using information that could have been obtained at low cost before the period of coverage. As such, competitive risk classification operates over time to eliminate “cross-subsidies” among policyholders to the extent that it is cost efficient to do so.
Given discretion, some insurers will engage in "subjective" underwriting. Some of the characteristics that are related to expected accident costs or underwriting expenses are difficult to measure or quantify with objective tests. Examples include an applicant's proclivity to engage in fraud or the likelihood that an applicant will pay subsequent premium installments. Competition will only reward subjective judgment to the extent that it helps to identify policyholders who on average will have either higher or lower claim costs. Erroneous judgments either will be penalized by adverse loss experience (e.g., the subjective assessment understates expected claim costs), or they will result in an unnecessary loss of sales for the insurer and agent (e.g., if the assessment overstates expected claim costs).

Given substantial discretion in underwriting and rate classification, almost all policyholders can obtain coverage in the voluntary auto insurance market, and cyclical fluctuations in prices and the supply of coverage are likely to have only a minor impact on the proportion of drivers insured in the involuntary market. Instead, there are two principal causes of large involuntary markets: 1) inadequate involuntary market rates that compete with and crowd out the voluntary market, and 2) voluntary market rate regulation that produces inadequate rates and thus makes insurers unwilling to write coverage voluntarily.

The Michigan Involuntary Market Table 5 presents information on the size of the involuntary market in Michigan and other states in 1987. Seventeen states had involuntary market shares of total insured car-years for liability coverage greater than or equal to three percent. Michigan ranked 17th with an involuntary market share of three percent. Twenty-eight states had less than one percent.

31. Even without cyclical fluctuations, a small proportion of drivers might be unable to obtain coverage in the voluntary market as a result of adverse selection. A significant number of drivers also may only be able to obtain coverage in the "non-standard" voluntary market, as opposed to the standard or "preferred" market. The existence of these segments in the voluntary market reflects the risk assessment process discussed above.

<table>
<thead>
<tr>
<th>State</th>
<th>Percent</th>
<th>Range</th>
<th>Number of States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts</td>
<td>58.47%</td>
<td>50 to 60%</td>
<td>1</td>
</tr>
<tr>
<td>New Jersey</td>
<td>44.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Carolina</td>
<td>32.81</td>
<td>40 to 50</td>
<td>1</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>30.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>North Carolina</td>
<td>22.52</td>
<td>35 to 40</td>
<td>2</td>
</tr>
<tr>
<td>New York</td>
<td>15.64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>District of Columbia</td>
<td>15.53</td>
<td>20 to 30</td>
<td>1</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>12.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Connecticut</td>
<td>9.45</td>
<td>10 to 20</td>
<td>3</td>
</tr>
<tr>
<td>Delaware</td>
<td>7.21</td>
<td>5 to 10</td>
<td>2</td>
</tr>
<tr>
<td>Michigan</td>
<td>3.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illinois</td>
<td>0.08</td>
<td>3 to 5</td>
<td>7</td>
</tr>
<tr>
<td>Indiana</td>
<td>0.06</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ohio</td>
<td>0.01</td>
<td>1 to 3</td>
<td>6</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wisconsin</td>
<td>0.00</td>
<td>.1 to .1</td>
<td>13</td>
</tr>
<tr>
<td>Countrywide</td>
<td>6.75</td>
<td>0 to .1</td>
<td>16</td>
</tr>
</tbody>
</table>

Note: Percent of liability insurance car-years insured in the involuntary market.  
Source: AIPS Circular BMC 89-14, (April 14, 1989)

or insured vehicles in the involuntary market. Fifteen of these states (including the neighboring states of Illinois, Indiana, Ohio, and Wisconsin) had less than one tenth of one percent of insured vehicles in the involuntary market. The five states with the largest involuntary market shares each have substantial restrictions on underwriting and rate classification, restrictive voluntary and involuntary market rate regulation, or both. Most of the other states with greater than one percent of insured vehicles in the involuntary market regulate voluntary market rates or are likely to hold involuntary market rates below the expected cost of providing coverage for some groups.

The 1977 report by the Insurance Bureau emphasized an increase in the number of applications in the Michigan assigned risk
plan, but it did not mention the share of vehicles insured in this plan.33

Figure 3 shows the percentage of vehicles insured in Michigan’s involuntary market each year from 1973 to 1987. As can be seen, the percentage increased sharply in 1977. However, at its peak in 1978, the involuntary market accounted for just over four percent of total insured vehicles. The involuntary market share declined to just over two percent by 1980, the year prior to the effective date of the Essential Insurance Act.34

33. A similar point is made by John Hogan, Note 20 supra, and by Dawant and Cabot, Note 35 supra. As suggested in the latter article, the proportion of vehicles insured in the involuntary market will tend to increase the proportion of policies insured in the involuntary market if involuntary market insurers are less likely to own and insure more than one car than are voluntary market insurers.

34. If Michigan had a reinsurance facility rather than the MAFF, its involuntary market share in 1981 and subsequent years probably would have been much higher, since insurers would have the incentive to code all business to the facility for which restrictions on rate classification (e.g., age sex rating) produced rates lower than would exist under cost-based pricing. Also see U.S. GENERAL ACCOUNTING OFFICE, Note 29 supra, ch. 4.
Between 1975 and 1977, the involuntary market share in Illinois increased from 0.44 percent to 1.04 percent. It declined in 1978. Ohio's involuntary market share increased from 0.18 percent in 1975 to 0.20 percent in 1977; it declined in 1978. Why was Michigan's involuntary market share and the increase in its share larger than that for its industrial neighbors during this period? The most likely causes are either lags in voluntary market rate approval during a period of rapid growth in claim costs, inadequate involuntary market rates, or both. 35

Consequences of the Act

Cross-subsidies from Low to High Risks

The limitations on cost-based pricing in the Essential Insurance Act have created subsidies (lower premiums) for some groups and implicit taxes (higher premiums) for other groups. For many rating classes, insurers are able to identify subgroups ex ante that on average will be likely to have different levels of losses, and historical losses for these subgroups will be significantly different. In general, the direction of the resultant subsidies is from drivers who on average have lower expected claim costs to drivers who on average have higher expected claim costs.

The most obvious examples of subsidies in Michigan include: 1) young females subsidizing young males, 2) young married persons subsidizing young single persons, and 3) the tendency for persons who reside in areas with low accident costs to subsidize persons in areas with high accident costs. 37 It cost-based pricing is allowed, the

35. Data obtained from APCI Facts (1979 and 1983 eds.). Compare these results to the 1977 report's discussion of national availability problems in auto and homeowner's insurance [see Essential Insurance in Michigan, Note 20 supra at 1], also see Note 21 supra.

37. The problem of "clean" risks (drivers without prior accidents or violations) in involuntary markets [see the 1977 report] also is likely to be caused largely by state regulation.

37. As discussed further below, the extent of the third form of subsidy probably has declined since the Essential Insurance Reform Act took effect in 1986. Evidence on the short-term impact of the Essential Insurance Act on rates and territorial classification is provided in A Year of Change, Note 20 supra. A later study by the Michigan Insurance Bureau [see Wallace, Utilizing Actuarial Rate Setting: The Michigan Experience, 31 Ins. L. 127 (1984)] presented evidence that when the Essential Insurance Act became effective in 1981 total premiums for mandatory coverage increased by
use of sex, marital status, and territory as rating variables significantly improves the accuracy of rate classification. Within reason, these traits can be observed with a high degree of accuracy and for a relatively low cost. Although these characteristics may not be readily controlled by the individual, their use in rate classification is neither subjective nor arbitrary.

Rates for the MAIPF also are likely to produce a subsidy because in certain cases they are designed to be competitive with voluntary market rates. By law, base rates for the MAIPF in the highest-rated territory are set equal to the average of voluntary market base rates for the top five insurers. Base rates for other territories are set from 105 percent to 120 percent of the average voluntary market base rates for the top five companies, with the higher-rated territories receiving the lower percentage increases. Since many drivers in the MAIPF will not meet the law’s requirements for a mandatory offer of voluntary market coverage, the average driver in the MAIPF will tend to have significantly higher expected accident costs than drivers who are insured voluntarily. Prior approval regulation of MAIPF rates also may constrain rates below expected costs for some groups of drivers. The overall system tends to produce a subsidy to drivers who on average have higher expected accident costs, and the subsidy will

no more than 20.9 percent for young females and decreased by no more than 15.1 percent for young males. The U.S. General Accounting Office, Note 29 supra, at ch. 6, noted that for all coverages combined, the corresponding figures were 28.9 percent maximum increase and a 104 percent maximum decrease. It is objected by some that net of unmixed rating that greater use of mileage as a rating variable would reduce the adverse consequences of unmixed rating to young females. See, for example, Butler, Butler and Williams, See Driver’s Mileage, Accident, and Insurance Cost Data Show that Just for Insurers Overcharge Most Women, Posts 1 and II, 61 Ins. Sec. 243, 142, respectively (1982). This discussion generally ignores the cost of verifying mileage accurately and the reduction in the predictive value of mileage that will occur when young persons have a substantial incentive to underestimate mileage to produce a lower premium. Although the thrust of the discussion by Wallace (see above) was that subsidies produced by the Essential Insurance Act were of mental consequence. It also presented evidence that the elimination of marital status as a rating factor led to large premiums increased for young married males.

39. For this reason, theory suggests that the use of these variables is likely to be efficient (even when the impact of subsidies on premiums is ignored) in the sense that the gains to persons whose rates are made lower by their use are less than the costs to persons whose rates are made higher. See Crocker and Snow, The Efficiency Effects of Categorical Discrimination in the Insurance Industry, 91, or POLITICAL ECONOMY (1966). Also, see the discussion below on the impact of subsidies on accident costs.
tend to be greatest for drivers in the Detroit area due to the restrictions on MAIFP base rates in territories with the highest voluntary market rates. Although the magnitude of the assessments paid by insurers to cover operating losses of the MAIFP has been small relative to premiums in recent years, the expected cost of assessments increases rates in the voluntary market. Moreover, a relatively large market share for the MAIFP in Detroit (see below) or any other area is likely to reflect regulatory constraints on cost-based pricing rather than inadequate competition.

**Drawbacks of Subsidies**

Subsidies make coverage more affordable to some drivers. They also make it more likely that some drivers buy mandatory coverage instead of driving uninsured. However, in essence, restrictions on cost-based pricing require persons who on average have lower expected accident costs to share losses with persons who on average have higher expected costs. Although some persons regard such subsidies as fair, others will not. Moreover, the higher premiums made necessary to finance subsidies make insurance less affordable for drivers who bear the cost of subsidies. The general public also may not be aware of the nature and magnitude of cross-subsidies in Michigan and other states. In some instances, the consequences of restrictions on underwriting and rate classification, such as a larger involuntary market, may be attributed incorrectly to inadequate competition and used to support proposals for additional regulation.

If large numbers of drivers pay a modest increase in premiums to finance significant premium reductions for a relatively small group, overall affordability may in some sense be improved. However, even in this case a significant drawback of restrictions on cost-based pricing is that they alter the incentives for many drivers to take precautions to control accident costs; the result is that the total cost of accidents and accident prevention will increase. Restrict-
tions on cost-based pricing also are likely to increase accident frequency and severity. Persons whose rates are made lower will tend to buy more extensive coverage (e.g., choose lower deductibles) and undertake fewer precautions to reduce expected accident costs. Even though persons whose rates are increased will tend to buy less coverage and take greater precautions, it is likely that the overall effect will be fewer precautions and greater accident frequency and severity. As a result, any overall improvement from subsidies in auto insurance affordability is likely to diminish over time.

Losses incurred by drivers insured in the MAIF are divided among all insurers in the state. Servicing insurers for the MAIF are required by statute to employ the same claim settlement methods as used in the voluntary market. Nonetheless, the fact that expenditures on claim settlement are borne by the servicing carrier (in exchange for receiving stipulated fees expressed as a percentage of premiums) while the losses paid are spread among all insurers may dilute the carrier's incentive to minimize the sum of claim costs and loss adjustment costs. Although the effect could be minor in the MAIF given its modest size, it would become more pronounced if any policy were adopted that increased significantly the size of the MAIF or changed the involuntary market mechanism to a reinsur-

ance facility.

41. For further discussion in the context of insurance, see Rottenberg, Sermale, and Harrington and Pritchett, Note 29 supra. Even though empirical analysis of the possible impact of subsidies on claim costs has not been undertaken, this conclusion is suggested by the fact that taking a given precaution is likely to have a greater effect on expected accident costs for high-risk drivers than for low-risk drivers, other things being equal. Moreover, a small change in premiums for each person "taxed" to finance subsidies is likely to have a less than proportional impact on precautions compared to a large change in premiums for each person subsidized.

42. As an example of the adverse effects of restrictions on risk assessment, it is likely that the Essential Insurance Act contributed to the auto theft problem in Michigan. The specified underwriting and rating criteria contained in the Act provided little incentive for a policyholder to take restrictive precautions to reduce the likelihood of theft. The Act is likely to have reduced the ability of insurers to deny coverage or charge higher rates to persons who on average would be more likely to engage in theft-related fraud. As previously noted, the three cities studied by the ISO and NAB (Note 17 supra) with the highest theft risk in 1987 were Newark, Boston, and Detroit. The fact that Massachusetts and New Jersey are both well-known for regulatory policies that promote cross-subsidies among motorists (see, for example, Rottenberg and Hinzel, Note 20 supra) is probably suggestive in this regard.

43. This problem has plagued states with reinsurance facilities, as well as the New Jersey Joint Underwriting Association. For further discussion, see U.S. General Accounting Office, Harrington and Pritchett, and Harrington, Note 29 supra.
Subsidies for drivers who on average have higher expected accident costs also are likely to reduce temporarily the pressure on policymakers to deal with the underlying causes of high premiums. High premiums indicate that claim costs are high. If the government attempts to spread claim costs more broadly in the population through cross-subsidies, public pressure for actions that reduce claim costs efficiently and thus premiums initially is likely to decline. However, if cross-subsidies increase growth in claim costs and thus aggravate affordability problems over time, subsidies will only delay public pressure for substantial action to reduce premiums.

**Territorial Rating**

The Essential Insurance Act limited insurers to a maximum of 20 different territorial rates. It also required that the base rate in any territory be no less than 90 percent of the base rate in an immediately adjacent territory and that the smallest territorial base rate be no less than 45 percent of the highest territorial base rate. The objective of these restrictions was to reduce differences in rates across territories. The restrictions were based on the assumption that an insurer would write roughly the same proportion of drivers in different territories so that any subsidy to high-cost territories would be spread broadly by insurers among low-cost areas. However, as claim costs increased in Detroit, serious market dislocations occurred. Market concentration increased in Detroit, and insurers with large volume in Detroit found it difficult to compete outstate with insurers that had a minimal presence in Detroit without expending the effective date of the Essential Insurance Act, insurers refiled their rates for one year. Change, Note 30 supra, for details. This section also presents evidence that the effects of the base rate for the lowest-cost territory for the highest-cost territory was greater than 45 percent in 1981 for each of the insurance states. Evidence presented for several large insurers in Auto Insurance Rating in Michigan, Note 10 supra, indicates that their rates had declined to 45 percent by 1980 and that they fell below 45 percent following the relaxation of restrictions on territorial rates in 1985. Also see Note 10 infra and accompanying text. Further discussion, see, for example, U.S. General Accounting Office, Note 33 infra, at ch. 4. Two provisions in the Essential Insurance Act suggested that its designers were aware of the problems that might arise. One provision contained strict limitations on the ability of insurers to cancel contracts with independent agents. Another provision gave the insurance commissioner authority to order insurers to establish sales offices in areas with inadequate competition. The latter provision was repealed in the 1985 Reform Act.
Personal Automobile

perceiving large operating losses in Detroit. Absent change in the law, it is likely that over time the market would have become increasing bifurcated between Detroit writers and outstate writers.46

The 1986 Reform Act

The legislature adopted a bill in 1985 that would have substantially reduced restrictions on territorial rating. Then Governor Blanchard vetoed this bill, which had been opposed by the Insurance Bureau for possibly allowing large rate increases in Detroit. A modified bill was enacted that took effect in early 1986. This law suspended the 45 and 90 percent constraints on territorial rating, allowed insurers to raise rates in Detroit to the average level of the top five insurers, and restricted annual rate increases in Detroit to four percent plus the percentage change in the Consumer Price Index ("CPI"). The law also allowed insurers to redefine territories in Detroit. A maximum of six territories in Detroit could be used, and the weighted-average rate of any new territories could not exceed the weighted-average of previous territories. The law also allowed insurers, beginning in February, 1988, to exercise a one-time election to limit annual rate increases in Detroit to the percentage increase outside of Detroit, rather than remaining subject to the percent change in the CPI plus four percent limit.

The 1986 Reform Act also contained a number of provisions designed to reduce auto thefts. An Automobile Theft Prevention Authority was established. Insurers were required to establish premium discount plans for the installation of auto theft prevention devices. Provisions were also included that, under certain conditions, required insurers to verify the existence of an auto, to require that thefts be reported to police in order for claims to be paid, and to allow insurers to impose a $500 deductible or a 10 percent co-payment if the auto was stolen while unattended with the keys in the vehicle.47 These changes are likely to have reduced auto thefts.48

46. This result assumes that the insurance commissioner would not have exercised authority given in the act (see Note 45 supra) to order companies to establish sales offices in Detroit.
47. The 1986 Reform Act also changed the basis for MAPF rates from the average of the top 10 insurers to the average of the top five. Premium discounts for thefts that use also were required.
48. See AUTO THEFT IN MICHIGAN, Note 18 supra. The insurer-funded "HEAT" (Help Eliminate Auto Theft) program, which provides rewards for tips leading to the
Territorial rating remains subject to considerable controversy in Michigan. The focus of the debate continues to be high rates in Detroit. The NAACP has threatened to sue insurers for unfair discrimination. Territorial boundaries are again being criticized as arbitrary and unfair. In addition, it is argued that high rates in Detroit are caused primarily by inadequate competition.

The Insurance Bureau's 1989 Report

The Michigan Insurance Bureau released a report in 1989 on the effects of the 1986 Reform Act. The report argues that insurers with large market shares in Detroit did not become more competitive outside of Detroit after the law took effect. Although it presents evidence that rates since 1986, for a number of insurers, increased more rapidly in the Detroit area than the remainder of the state, it does not consider that this result would be expected if the previous territorial restrictions had produced inadequate rates in Detroit or that it possibly could reflect more rapid growth in expected claim costs for certain coverages in Detroit. It presents evidence that insurers increased their number of territorial base rates and that rate differences between territories often exceeded those that would have been permitted by the previous 45 and 90 percent rules. The report illustrates substantial diversity in territorial boundaries and rate factors across insurers, but it does not recognize that such diversity is consistent with competition and that it will tend to smooth premium differences between adjacent regions. Instead, the report argues that territorial rating is largely arbitrary and subjective.

The report argues that the Detroit market is not competitive because it is highly concentrated, because a number of geographical areas (as defined by United States postal zip codes) have very few insurance agents, and because 16 percent of Detroit exposures (most of which were eligible for coverage in the voluntary market) were

arrest of persons involved with auto theft, also appears to have had some success. See Here Today Gone Tomorrow, 63 I. Of Alumni, Insurance 1 (1985). Recent history in Michigan probably illustrates the likely consequence of significant restrictions on underwriting and rate classification. If restrictions reduce incentive for policyholders to control costs, additional regulations may be necessary to control the resultant increase in costs.

40. Auto Insurance Rating in Michigan, Note 19 supra. This report was required by the 1986 Act.
insured in the MAIF (also see Note 51 infra). The discussion of
markets concentration does not consider that the large number
of auto insurers in Michigan could readily expand their writings in De-
troit if rates were excessive. 50 The report notes that Insurance Bureau
data providing addresses of agents did not indicate whether they
were for the agent's business or residence. It nonetheless interprets
the addresses as though they all indicate place of business. The analy-
thesis will be distorted to the extent that any agents who gave resi-
dential addresses do not live in the same area that their businesses
are located.

The report argues that the large market share of the MAIF in
Detroit does not reflect MAIF rates that are competitive with the
voluntary market. However, the data shows for a young male driver
in the Detroit area indicate that MAIF rates were competitive. 51
The fact that MAIF rates may not be among the lowest for certain
drivers in or outside of Detroit is not relevant to inferences about
whether drivers insured in the MAIF received rates that were compet-
itive with the voluntary market. The appropriate question to ask
is how MAIF rates compare to those in the voluntary market for
Detroit drivers actually insured in the MAIF. The report did not
pose or answer this question.

The 1989 report by the Insurance Bureau ignores almost com-
pletely that loss costs are higher in the Detroit area than in the re-
mainder of the state. Exhibit 14 (p. 102) illustrates higher losses in
Detroit, but the report argues that drivers in the Detroit area pay
more than their fair share for coverage because the loss ratio (ratio
of incurred losses to earned premiums) for all coverages in the De-

50. The importance of considering ease of entry and expansion in assessing
whether a market is competitive is a fundamental tenet of basic economic theory.
The 1989 report notes (at page 30) that the market share of the largest four insurers
in Detroit (based on insured exposure) was 71 percent in 1987 and states that market
with a ratio of 60 percent or more would be considered highly concentrated.
The market share shown in the report for the top four times when MAIF business is
excluded sum to 59 percent [Page 51].

51. See Exhibits 6, 7, and 8, AUTO INSURANCE RATING IN MICHIGAN, Note 19
supra. The report notes that "While the base rate [in Detroit] may be 'competitive'
with the base rates in the voluntary market, the resulting premiums often are not" (p.
54). The Executive summary states (p. 11): "Premiums charged eligible drivers by the
Facility are not competitive with those charged by the top ten insurers, either in
Detroit or elsewhere." Based on the information provided in the report, this latter state-
ment is misleading. The report also notes (p. 106) that the market share of the MAIF
in Detroit increased from 8.1 percent in 1985 to 17.1 percent in 1987.
trot area in 1987 was less than the statewide loss ratio (58.6 percent vs. 64.1 percent). This comparison does not consider that the loss ratio that would allow insurers to break even from writing coverage will depend on numerous factors that could vary between Detroit and the rest of the state, such as differences in underwriting expenses associated with different marketing systems and differences in the mix of business between liability, PIP, collision, and comprehensive coverage. Even if this comparison were appropriate, it would not support rate reductions for the two regions in Detroit (insurer and middle market) with much higher premiums per vehicle in 1987 than the remaining regions shown for the Detroit area. These two regions had loss ratios that were approximately equal to the statewide loss ratio (see Exhibit 18, p. 102).

To address the perceived deficiencies in territorial rating, the report proposes that rating territories be “no smaller than a county or a Metropolitan Statistical Area, which ever is larger.” In an attempt to prevent market dislocations that occurred under the prior restrictions on territorial rating, it also proposes an assigned risk procedure in which persons in the MAIIP who satisfied the Essential Insurance Act’s eligibility rules would be assigned to “voluntary market insurers in inverse proportion to their presence in urban markets.” Each insurer also would be required to have a statewide marketing plan and to have a toll free number to provide persons with rating information, to take applications, and to refer persons to agents.

The Insurance Bureau’s proposals would create significant cross-subsidies and is thus subject to the drawbacks that were discussed.

52. Comparisons of loss ratios for one year also may be greatly affected by differences in unanticipated changes in loss costs across regions. As an example, if their rates declined more than expected by insurers in Detroit in 1985 compared to the remainder of the state, other things being equal, the loss rate in Detroit would be lower than in the remainder of the state. Similarly, if in any given period losses were higher than expected in a given region, the loss ratio would be higher in that region. It also was not clear whether MAIIP experience, which was likely to have a significantly greater loss ratio in Detroit, was included in the data.

53. Although the report endorses file-and-use regulation of overall rate levels, it also proposes a significant expansion in the powers of the insurance commissioner should the commissioner find that a rate is inconsistent with the standards set forth in the Essential Insurance Act. For example, upon a finding that any rates were excessive, an insurer must make rebates to policyholders. The adoption of this proposal could change the file-and-use system to a de facto system of prior approval if it discouraged insurers from changing rates without explicit or tacit regulatory approval.
earlier. As was the case in 1977, the Insurance Bureau attributes affordability problems largely to insurer underwriting and rate classification. The analysis and conclusions are inconsistent with the fact that rates are high in Detroit because claim costs are high. If subsidies to certain areas of Detroit are in the public interest, they should be able to withstand public scrutiny. The legislature should only undertake such action as a last resort after a full debate of the issues. If the motivation for subsidies is to reduce affordability problems, they should be targeted to intended recipients as accurately as possible, and they should be designed to minimize their impact on productive behavior, such as labor force participation. Premium increases, taxes, or fees necessary to finance subsidies should be clearly identified to the public.

Preserving And Improving No-Fault

The Michigan no-fault law provides prompt, assured, and comprehensive payment of economic losses to injured persons without regard to fault. The tort limitation, which is the most effective of any no-fault law, substantially reduces attorneys’ fees and other litigation costs and the amount of premiums that otherwise would be used to finance payments for noneconomic losses for minor injuries. A study of 46,000 countrywide claims closed in 1987 indicated that only 12 percent of bodily injury related claims in Michigan would be likely to satisfy the threshold for tort liability. Although double the six percent figure obtained in a comparable study of

56. The proposed limitations on tortial recovery also might not be very successful in targeting subsidies to low income drivers. See Schulze, Note 20 supra, and the references cited therein for general discussion of this point.

57. These features of the law illustrate the fundamental tradeoff between first-party benefits for economic losses and tort liability that has been emphasized in number of the advantages of no-fault. Significant reassessments of tort liability are essential without such limitations, i.e., no PIP benefits can increase greatly the overall cost of coverage and virtually eliminate affordability problems. Attempts to mandate large PIP benefits without imposing significant tort restrictions have created serious problems in a number of states. See U.S. DEPARTMENT OF TRANSPORTATION and SMITH, Note 57 supra. These problems ultimately influenced the repeal of no-fault in Pennsylvania and Nevada.

claims closed in 1977, the percentage for Michigan was still well below the average of 39 percent for all states with no-fault and the percentages for New York (29 percent) and Florida (33 percent), two other states with verbal thresholds. Studies also suggest that overall premiums for bodily injury related coverages in Michigan are significantly lower than would have been the case if no-fault had not been adopted.57

Despite the overall success of the law, a number of ways exist in which the no-fault system could be improved to benefit policyholders and to mitigate auto insurance affordability problems. PIP costs have increased rapidly in recent years, and the effectiveness of the law’s threshold for tort liability for noneconomic loss has been eroded by judicial interpretation.58

**PIP Coverage**

Rapid growth in recent years in PIP claim severity in Michigan reflects increases in the overall cost of medical care. It also has been influenced by the comprehensive level of PIP benefits and a lack of provisions that could help reduce benefit utilization in efficient ways. Suitable modifications in PIP coverage could reduce the level and growth in PIP premiums in ways that would benefit a large majority of drivers. They also would provide significant relief to low income persons for whom affordability problems are most pronounced.

**Michigan Catastrophic Claims Association**

The Michigan Catastrophic Claims Association ("MCCA") was established by the legislature in 1978. The MCCA reinsures all PIP claims for medical and rehabilitation costs that exceed $250,000. Although only a small fraction of claims exceed this limit, the cost of unlimited benefits with virtually no controls on use is very large.59


58. Several bills have been proposed that would attempt to improve the performance of the law by strengthening the tort threshold and helping to control PIP claim costs.

59. The frequency of PIP claims that will exceed the $250,000 limit is estimated as less than 0.1 percent. See Memorandum on PIP Claims Study, from Herman
The expected cost of MCCCA coverage increases premiums. The MCCCA assesses each auto insurer a fixed amount per insured vehicle. The annual assessment for 1990 was $66 per vehicle; the assessment for 1991 is $101. Assessments are based on the expected discounted cost of paying claims, and they generally include an amount designed to reduce the MCCCA deficit. Estimating future costs for such injuries is problematic and subject to potentially large errors. Total assessments have grown rapidly in recent years, from $57.5 million in 1985 to $200 million in 1988. Nonetheless, the deficit of the MCCCA (assets less discounted liabilities) was estimated at $300 million as of year-end 1988. Political pressure is mounting for developing methods to reduce the size of the estimated deficit and future assessments.

The no-fault law's requirement to cover necessary and reasonable expenses has been generous to injured persons. Common expenses include substantial costs to renovate (or buy new) homes, to provide home health care (even if it is more costly than institutional care), to provide specially equipped vans, and to provide vocational training. It is not clear that significant incentives exist for injured persons (or their families or guardians) to request anything but the most expensive form of care. Unlimited benefits and the lack of provisions for cost control in the no-fault act are very costly, and they are likely to become much more costly over time unless the law is modified. Once a person is seriously injured, it is clearly in his or her interest to seek the best and therefore most expensive care. The key question that should be addressed is whether, before injury, most auto owners are willing to pay the high premiums that will be necessary to provide for such benefits in the event that they become seriously injured. The answer in many cases is likely to be "no."

Cost control provisions that provide for reasonable quality are needed for catastrophic expenses paid by the MCCCA. The goal should be to include the type of controls that would be included in a vol-

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I. Arness, Auto-Owners Insurance to Insurance Industry Task Force (Nov. 2, 1989). The most common injuries that produce large claims involve brain damage or paralysis. These injuries typically require lifetime care.

See note 41 ante and accompanying text.

41. MCCA Annpol Statement, 1988. The predicted MCCCA deficit as of year-end 1989 was $346 million. See Milliman and Robertson, "An Estimate of the Pure Losses and Loss Expenses for Assessments to be Set by the MCCCA for Calendar Year 1990," preliminary draft, Exhibit I (n.d.).
unitary insurance arrangement, such as employment-related group health insurance. Of equal importance, serious consideration should be given to allowing drivers either 1) to maintain unlimited benefits and pay for such benefits through MCCA assessments or 2) to choose a $250,000 limit on benefits and forego paying a premium for MCCA coverage. The $250,000 limit would be sufficient to cover the vast majority of claims. In the small number of cases that would exceed this limit, alternatives exist to MCCA coverage. Many persons will have large limits on their group health coverage. Others would become eligible for government-financed medical care, and some persons would receive “free” care from hospitals and physicians with the costs shifted to other parties.

Other Cost Control Measures

It is commonly believed that unlimited medical care coverage in health insurance plans can lead to excessive use of health care services. The no-fault law allows insurers to offer a $300 deductible in PIP coverage. Serious consideration should be given to allowing insurers to offer other forms of co-payments to policyholders in exchange for lower premiums. For example, a choice of deductible amounts and a 20 percent co-payment on all claims above the deductible could be offered (subject to some reasonable limitation on total uninsured costs per injury), with the provision that tort liability would still be limited for all medical expenses. Many consumers might prefer to bear the risk of small losses in exchange for reduced premiums (which would include savings on administrative expenses necessary to pay for small losses). Increased co-payments also could encourage consumers and health care providers to reduce the utilization of services in efficient ways.

Duplicate Coverage

Many Michigan motorists are able to recover from both PIP coverage and alternative sources of health insurance benefits. The availability of duplicate coverage increases the incentive for persons to inflate their medical expenses. Economic theory and common sense suggest that most persons would not be willing to pay for duplicate coverage. The no-fault law requires insurers to offer premium reductions for auto owners who make PIP coverage excess over other forms of cov-
edge. However, administrative expenses associated with coordinating coverage, differences in the scope of alternative sources of benefits, and the possibility that alternative coverage will no longer be in effect at the time of an accident reduce significantly the premium savings that are available to policyholders from making PIP coverage excess. As a result, this choice often will not be attractive.

One proposal that has been discussed in Michigan is to require mandatory offset of PIP benefits for alternative forms of private coverage. A potentially attractive alternative to mandatory offset, which could be instituted in conjunction with a reduction in required PIP limits, is to allow policyholders with alternative coverage that meets specified requirements to forego buying PIP coverage (medical, wage loss and survivor coverage, or both) up to some specified limit of benefits without allowing policyholders to sue in tort for expenses that otherwise would be covered by full PIP coverage. A possible advantage of this system is that it would save on the expenses of coordinating PIP and alternative health coverage for losses up to the specified maximum. It also would tend to produce a more accurate premium reduction than under the current system. Moreover, alternative coverage already is likely to contain a number of features to help control costs, such as prepayment of providers or deductibles and other co-payments. In summary, a redesigned PIP benefit system that would preserve most of the advantages of the present plan, emphasize cost control, and make coverage significantly more affordable is illustrated below:

1. Auto owners could choose to maintain uninsured coverage for medical care costs or choose a lower limit (e.g., $250,000 or less) in exchange for lower premiums.

2. Auto owners with alternative private medical expense coverage could choose not to buy the minimum PIP benefit limit described in 1 above. They would maintain the choice of buying coverage in excess of the minimum limit.

3. Deductible and co-payment options would be provided for "basic" PIP benefits in exchange for lower premiums. Buyers could choose among the available options.

62. Were this to be done, all policyholders would need to pay premiums to finance assessments until the MCCA deficit on prior claims was eliminated.
4. Policyholders who opted for reduced PIP coverage could not recover for losses in a tort action that would have been paid by full PIP coverage.

Possible objections to this system would be that it would hurt low income persons who might have to choose lower coverage limits to reduce premiums, that much of the likely increase in uninsured medical expenses would have to be borne by other parties, and that some persons might choose low limits without fully considering the ramifications of their decision. However, it is not at all clear that forcing low-income persons to buy costly, comprehensive PIP benefits is appropriate, especially when it may lead to pressure for subsidies to make coverage more affordable. A fundamental drawback of compulsory coverage, whether liability or PIP, is that it exacerbates auto insurance affordability problems for those least able to afford coverage. Moreover, improved education and information disclosure could be developed if necessary to ensure that most motorists make informed decisions.

Adopting these changes also would require re-examining the notion (which frequently has been reflected in analyses of its constitutionality) that no-fault necessarily involves a tradeoff in which motorists obtain the right to receive first-party benefits for economic loss in exchange for restrictions on tort liability. The right to purchase and receive first-party benefits can exist even if it is not exercised. Moreover, even if the purchase of PIP coverage were completely optional, tort limitations would still entail a meaningful cost-benefit tradeoff for motorists. Even though no-fault restricts the ability of motorists to pursue tort claims, they receive a corresponding exemption from tort liability and pay lower liability premiums as a result.

Tort Threshold

Michigan’s verbal threshold for tort liability for noneconomic loss states that: “A person remains subject to tort liability for noneco-

63. For detailed discussion of this issue and other drawbacks to compulsory coverage, see Scott Harrington, the Efficiency and Equity of Compulsory Automobile Insurance Laws,” College of Business Administration, University of South Carolina [Jan., 1990].

64. Although the discussion in this section focuses on Michigan’s tort threshold, two other issues concerning tort liability for auto accidents in Michigan merit brief comment. First, since property damage liability claims under the tort system
nomic loss . . . only if the injured person has suffered death, serious impairment of body function or permanent serious disfigurement." Numerous court decisions have dealt with the meaning of "serious impairment of body function," and whether satisfying the threshold is a matter of law for the court to decide or a question of fact for the jury.

In Cassidy v. McGovern,98 decided in December, 1982, the Michigan Supreme Court held in a five-to-one decision that whether a serious impairment of body function had occurred was a question of statutory construction for the trial court as long as there was no material, factual dispute about the extent of injury. The court reasoned that the expression "serious impairment of body function" was not one in which the jury would have a clear sense of the intended meaning that to allow the jury to make the determination would increase litigation contrary to the objective of no-fault, and that having the court decide the issue would increase uniformity. The court also specified several criteria to be employed in determining whether a serious impairment of body function had occurred. It argued that the meaning should be considered in conjunction with the other criteria in the statute (death and permanent serious disfigurement), that it cannot mean any body function (e.g., "harm to a person's little finger"), that the injury should be "objectively manifested," and that it should interfere with a person's "general ability to lead a normal life." The court ruled, however, that the impairment need not be permanent.

involve lower litigation costs and payments to attorneys and do not entail payment for noneconomic loss, the case for no-fault property damage is less compelling than that for bodily injury. Dissatisfaction with no-fault property damage in Michigan is likely to have influenced the adoption of the law's "minor tort" provisions. (See the Michigan Insurance Bureau's April, 1978 report to the governor on consumer attitudes on no-fault.) The possible advantages of returning to the fault system for all property damage claims are worthy study. Second, Michigan has adopted a "pure" form of comparative negligence than in some instances allows a person who is primarily responsible for an accident to recover damages from a person who is only slightly responsible. Most states with comparative negligence employ a "modified" form in which a driver who is 50 percent or more (or, in some states, more than 50 percent) at fault cannot recover damages. Adopting the modified form of comparative negligence would reduce the cost of liability coverage. The merits of this change, as well as other issues related to no-fault, are debated in "No-Fault: The Real Story," Michigan Trial Lawyers Association No-Fault Task Force (Ree, 1983) and "Taking the Task Force to Task," Michigan Insurance Federation (n.d.).

In the next several years numerous appellate court decisions dealt with whether injuries satisfied the criteria set forth in Cassidy. By 1986, the members of the Supreme Court had changed substantially. In DiFranco v. Pickard,66 the court overturned Cassidy in a four-to-three decision. It ruled that whether an injury constituted a serious impairment of body function was a question for the jury unless reasonable minds could not disagree about the issue. It rejected the "objectively manifested" and "general ability to lead a normal life" criteria and essentially stated that all relevant factors could be considered to determine whether an injury satisfied the threshold. The clear implication was that soft tissue injuries for which there existed no evidence of physical damage might nonetheless satisfy the tort threshold. The court based this decision largely on the argument that the legislature had not intended to impose a substantial barrier to recovery for noneconomic loss when it enacted no-fault. The insurance industry has argued that the DiFranco decision has increased bodily injury liability claim costs.67 It has been proposed that the no-fault law be amended to codify the key elements of the Cassidy decision. Figure 4 illustrates changes in paid claim frequency per-100 vehicles for bodily injury liability and PIP coverage in Michigan. The figure also shows countrywide paid claim frequency for bodily injury liability. The values shown are the average frequency for the previous four-quarters divided by the average frequency for the four-quarters ending in December, 1984.68 Analogous results are shown for the frequency of new claims in Figure 5. Both figures suggest an increase in bodily injury claim frequency in 1987 that cannot be explained by changes in the number of injuries in Michigan [i.e., PIP claim frequency does not show the same pattern] or by countrywide trends in frequency. Since the DiFranco decision was decided in December, 1986, the results are consistent with a positive impact of the decision on the frequency of liability claims. The results also indicate a general decline in bodily injury claim frequency until 1987. This decline could reflect greater difficulty in satisfying the threshold after the Cassidy decision.

67. The majority opinion in DiFranco emphasized that Cassidy had made it very difficult to secure for noneconomic loss. The implication was that its ruling in DiFranco would increase the number of compensable claims.
68. Four-quarter averages are used to reduce the impact of any seasonal variation in claim frequency.
The Michigan legislature should make the statutory threshold as precise as is possible. Given the objectives and economic advantages of no-fault, it makes little sense to have large numbers of injuries subject to potential litigation to determine if the threshold has been satisfied. Under such conditions, insurance companies would be likely to pay many questionable claims for noneconomic loss rather than incur the expense and risk of letting the case go before a jury. The legislature should ensure that a strict threshold is maintained that limits tort liability for noneconomic loss to serious injuries. Erosion of the threshold in conjunction with large PIP benefits could greatly aggravate the affordability problem and threaten the entire no-fault system.

Conclusions

The Essential Insurance Act has reduced certain negative consequences of insurer underwriting practices, but it has created other
problems for the Michigan market. The law promotes cross-subsidies among consumers and reduces the incentives for many drivers to take precautions that would lower expected accident costs. Consideration should be given to modifying the statutory constraints to allow more discretion in underwriting and rate classification. The primary effect of any additional restrictions on cost-based pricing, such as those that involve territorial rating, would be increased subsidization of some consumers at the expense of others. The likely result over time would be even higher claim costs and premiums.

Michigan's no-fault law has several characteristics that could serve as models for other states. However, a number of modifications in the law are desirable to maintain its principal advantages and improve the affordability of coverage. The legislature should take action to provide consumers with significant choice in selecting personal injury protection benefit levels and to ensure that tort liability for noneconomic losses is restricted to serious injuries. These changes would benefit most motorists, low income groups that face high premiums in Detroit and other areas would especially benefit.
Actuarial Reserving and Financial Regulation

Introduction

Schedule P is a complex section of the Annual Statement, demanding much expertise to complete and to understand. The cross checks performed by the NAIC compare the Schedule P figures within its various parts, with other pages of the Annual Statement, and with Schedule P data from the preceding year. The NAIC uses Schedule P for three of the Insurance Regulatory Information System ("IRIS") tests, and investment analysts use the Schedule to measure the adequacy of a carrier's held reserves. Schedule P data are used to determine the reserving risk and the write-in premium risk charges in the risk-based capital formula, which account for most of an insurance company's capital requirements. Actuaries and accountants need a thorough understanding of this Schedule, both to complete it for their own company or client and to evaluate the performance of peer companies.
Completing and Using Schedule P


Sholom Feldblum

Purposes of the Schedule

Schedule P is designed to measure loss and loss adjustment expense reserve adequacy, both retrospectively and prospectively. The primary attribute of Schedule P is the display of historical triangles of the major loss and claim figures, showing the observed development over the past ten years and allowing the estimates of future development.

Part 1 provides a comprehensive view of the company’s current reserve structure, including gross and ceded reserves by line of business, accident year, and type (loss vs. expense). Part 2 provides a

1 I am indebted to Richard Roth, John Bray, Richard Hayes, and Stephen Lowe who thoroughly reviewed earlier drafts of this paper and suggested numerous corrections and additions. Richard Roth is Assistant Insurance Commissioner for the State of California and the architect of much of the new Schedule P. John Bray has conducted seminars on completing Schedule P, and he prepared many of the Schedule P exhibits for the NASC Annual Statement Instructions manual. Richard Hayes is the Manager of Accounting Policy and Analysis at Liberty Mutual, with responsibility for Regulatory Reporting. Stephen Lowe is a member of the American Academy of Actuaries Task Force on Risk-Based Capital, and he developed the Schedule P Part 7 exhibits to aid in the estimation of capital requirements for loss-sensitive contracts.

2 AVP and Associate Actuary, Liberty Mutual Insurance Co., Boston, MA
retrospective test, by accident year and line of business of reserves held in prior years. The totals from the one year and two year retrospective tests, shown in the Part 2 Summary exhibit, are used for IRIS tests 9, 10, and 11.

Several prospective tests of loss reserve adequacy may be done with Schedule P data. Part 3 provides paid loss development triangles, and the difference between Parts 2 and 4 provides case incurred (or "reported") loss development triangles. Link ratio "tail factors" may be estimated from the Part 2 "prior years" row. Average severities, both incurred or paid, may be estimated from the claim count figures in Part 5 combined with the loss histories in Parts 2, 3, and 4.

Schedule P has numerous other functions:

- It provides the data to compute the required excess of statutory reserves over statement reserves for the liability lines of business: Automobile Liability (Personal and Commercial), Other Liability and Products Liability, Medical Malpractice, and Workers' Compensation.
- It provides the data for computing the reserving risk and the written premium risk charges in the risk-based capital formula, thereby setting the insurer's capital requirements.
- It shows payments and reserves for losses and loss adjustment expenses by accident year, thereby isolating blocks of business with good or poor experience. In addition, the accident year figures provided in Schedule P allow one to measure the effects of changes in loss reserve margins on the calendar year results reported in the Underwriting and Investment Exhibit.
- It shows the development of "exposure year" premiums resulting from exposure audits and retrospective adjustments.
- It shows the sensitivity of premiums and of reinsurance commissions to losses on loss-sensitive contracts.
- It shows both direct plus assumed and net experience, so that the effects of reinsurance transactions on accident year loss ratios can be examined.
- It provides the loss payment patterns needed for the federal income tax loss reserves discounting procedures.
It separates occurrence from claims-made experience for three lines of business.

Schedule P was revised extensively for the 1989 Annual Statement, with further modifications in every subsequent year through 1995. This paper explains what data are required for the schedule, and how the exhibits should be completed. It describes how Schedule P data allows prospective analyses of loss reserve adequacy, using both paid and incurred loss developments. Moreover, it discusses the uses made of Schedule P information by other reporting requirements, such as the risk-based capital formula, the Statement of Actuarial Opinion, and the IRS loss reserve discounting procedure.

Experience Period

Schedule P shows experience for all lines of business. The long-tailed lines show the 10 most recent accident years of data, plus a “prior years” row:

A. Homeowners/Farmowners,
B. Private Passenger Auto Liability/Medical,
C. Commercial Auto/Truck Liability/Medical,
D. Workers’ Compensation,
E. Commercial Multi-Peril,
F. Medical Malpractice (occurrence and claims-made separately),
G. Special Liability (Ocean Marine, Aircraft [All Perils], Boiler and Machinery),
H. Other Liability (occurrence and claims-made separately),
I. International,
J. Products Liability (occurrence and claims-made separately).

The short-tailed lines (which were in Schedule O before 1989) show the two most recent accident years of data, plus a “prior years” row:

I. Special Property (Fire, Allied Lines, Inland Marine, Earthquake,
       Glass, Burglary & Theft),
J. Auto Physical Damage,
K. Fidelity / Surety,
L. Other (Including Credit, Accident and Health).

Reinsurance is of two types, following the conventions used in the Underwriting and Investment Exhibit. Proportional reinsurance, or retro-reinsurance, is shown as assumed or ceded premiums, losses, and loss adjustment expenses in the exhibits for the appropriate lines of business. For instance, a 50 percent quota share treaty for personal automobile business is shown in the assumed and ceded columns of Exhibits 1B, 2B, etc.

Assumed non-proportional reinsurance, or excess-of-loss reinsurance, is divided into four categories and shown separately from the primary lines of business. Reinsurance experience that was included in Schedule 2 (line 30) before 1988 is now shown as Reinsurance D (or Exhibits 1Q, 2Q, and so forth) with a "2 year" exhibit format, though data are shown only for accident years 1986 and 1987. Reinsurance for accident years 1988 and later is divided into three parts: non-proportional property, non-proportional casualty, and financial lines (Reinsurance A, B, and C or exhibit categories N, O, and P). Reinsurance A, B, and C use the 10-year format. However, since only accident years 1988 and subsequent are shown, there are only eight accident year rows (and no "prior years" row) in the 1995 Schedule D.

Ceded non-proportional reinsurance is reported in the same exhibit as the underlying business. For instance, a company which cedes part of its workers' compensation business on an excess-of-loss treaty records the experience in the "ceded" columns of Part 1D. A company which retrocedes part of its workers' compensation business that is assumed on a non-proportional treaty shows the retrocession in Part 10 ("Reinsurance E").

I am indebted to Richard Roth for clarification of this. This is also the intent of the NAIC Instructions, which say:

- "Assumed" means reinsurance assumed, including from affiliated pooling agreements, but excluding any non-proportional reinsurance assumed reported as a separate line and reported accordingly.
- "Direct" means as directly written, but not if part of an affiliated pooling agreement.
- "Ceded" means reinsurance ceded on business so reported as direct or assumed.

In other words, ceded non-proportional reinsurance is reported in the reinsurance lines. Ceded non-proportional reinsurance is reported in the same exhibits where the underlying business is shown.
The Summary exhibits show 10 accident years of data, plus a "prior years" row. Ten accident years of data [as well as a prior years line] must therefore be kept for all lines of business, since all 10 years for every line are used for the Summary exhibits.3

For the individual accident years, the Part 1 premiums are calendar year but the losses and expenses are cumulative accident year. For instance, the 1989 premiums shown in column 2, 3, and 4 of Part 1 are calendar year earned premiums; they are not changed for subsequent "EBNR" (Earned But Not Reported) adjustments. The 1989 paid loss and expense figures in columns 5 through 11 of Part 1 are cumulative accident year figures: that is, payments from Jan. 1, 1989, through the Statement date for accident year 1989. The 1989 unpaid loss and expense reserves in columns 13 through 23 are the reserves held on the Statement date. For example, in the 1995 Annual Statement, these are the reserves held on December 31, 1995, for accident year 1989.

For the "prior years" row, no earned premiums are shown. In Part 1, the loss and expense payments, and the salvage and subrogation reimbursements, are only those made or received in the most recent calendar year. In Part 3, the loss and expense payments are those made since January 1 of the second calendar year shown along the column headings. [Thus, for the 1995 Annual Statement, these are payments made since January 1, 1987.] The unpaid loss and expense reserves are the reserves evaluated at the Statement date for Part 1, and at each December 31 for Parts 2 and 4.

Part 1 — Current Valuation

Part 1 shows cumulative experience by accident year at the Statement date. Premiums, losses, and allocated expenses are shown separately for "direct and assumed" and for "ceded," so that the analyst may determine the effects of reinsurance recoveries on reported loss ratios (columns 28, 29, and 30).2 If the direct and assumed loss

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2. Member allocations from intercompany pooled direct business are reported in the "direct and assumed" columns. That is, the member allocations of pooled direct writings are considered direct business, regardless of which company's paper the policy is written on and the reinsurance transactions shown in Schedule 7. For instance, suppose that two members of a company group, Insurer A and Insurer B, have a 50 percent intercompany pooling agreement, in which each receives half of
ratio is significantly higher than the net loss ratio, the business ceded may be poor. If so, the reinsurers may cancel treaties, raise reinsurance rates, or underwrite facultative business more carefully. Thus, the net loss ratio is influenced by the reinsurance market at the current time. The direct and assumed loss ratio reflects the quality of the primary insurer's book of business, and it may be a good predictor of both the direct and net loss ratios in future years.4

Parts 2, 3, and 4 show historical loss triangles for net losses and ALAE only, there are no corresponding triangles for direct business. However, historical loss triangles for direct and assumed business can be formed by joining Annual Statements from successive years.4 For instance, by March 1, 1996, a seven year historical loss triangle of direct and assumed business can be developed from Schedule P, Part 1, of the 1989 through 1995 Annual Statements.5

Part 5 shows historical claim count triangles for "direct and assumed" business. In fact, all the claim count columns in Schedule P, whether in Parts 1, 3, or 5, refer to "direct and assumed" business, not to net business.

Part 6 shows historical development of "direct and assumed" earned premium and of ceded earned premium. The "exposure year" earned premium in Part 6 is similar to accident year losses.

the total premiums and losses. Suppose further that Company A writes a policy with a $100,000 premium. In Schedule P, this is reported as:

- $100,000 of direct business written by Company A,
- $50,000 of business ceded by Company A to an affiliate (Company B), and
- $50,000 of business assumed by Company B from an affiliate (Company A).

In Schedule P, both Company A and Company B report this as $50,000 of direct business written by each company, there is no cession or assumption.

The assumed business in the individual line exhibits of Schedule P is proportional reinsurance only. Non-proportional assumptions are reported separately in the reinsurers A, B, and C lines. Thus, the assumed business is similar to the direct, in that it is not subject to the fluctuations of excess of loss treaties.

3. Compare Roth, 1986, p 66: "Surprisingly, very few companies—particularly small companies—have any idea how profitable or whether they are making money or whether the business being ceded is profitable or not profitable. Once they pay that reinsurance premium they don't care, it's just gone . . . Well, what happens is if the business that is being ceded is consistently unprofitable, we know that two or three years down the line they're not going to have any reinsurance. Also, it says that the business that they're writing is probably underpriced and that they will soon have problems."
Part 7 shows policy year earned premiums, losses, and reinsurance commission for business written on loss-sensitive contracts. Since these are policy year figures, and since they pertain only to a portion of the company's business, most of the data can not be reconciled with any other Annual Statement entries. Part 7 was devised for the loss-sensitive contract offset in the risk-based capital formula and it need only be completed by companies seeking this offset.

Premiums

Part 1 premiums are recorded by calendar year. Once entered, they are "frozen," and are not adjusted for subsequent EBNR developments. For instance, suppose a carrier issues retrospectively rated workers' compensation policies. Poorer than anticipated experience on a block of business will raise the loss figures at subsequent valuations for the appropriate accident years. In Part 1, the additional premiums received are assigned to the current calendar year, not to the years when the policies were issued. Schedule P would show overstated loss ratios for the year of policy issuance and understated loss ratios for the current year. More accurate "exposure/accident year" loss ratios can now be obtained by combining the information in Parts 2 and 6; see below.

In Part 1 of Schedule P, the "prior years" row is used only for payments made or received in the current year, or reserves held on open cases as of the statement date. No figures are shown for premiums on the "prior years" row, since no matching to losses is possible.

4. Salzmann, 1987, pp 120-121, notes that: "calculated accident year loss ratios are theoretically less accurate than policy year loss ratios," but he adds that "the primary purpose of Schedule P is to assist in the determination of adequate reserve levels—not the precise measurement of loss ratios." Upon reviewing an earlier draft of this paper, Richard Roth commented: "An acknowledged weakness of Schedule P is the mismatch between losses and premiums by year, especially for reinsurance and Workers' Compensation. Early drafts of Schedule P addressed this problem; however, the problem is not that easy to solve. It is not enough just to add a column for policy year premiums. Whole triangles of premiums must be reported." These triangles are now shown in Part 6 of Schedule P.
Loss and Loss Expense Payments

Columns 5 through 11 show loss and loss expense payments by accident year. For the individual accident years listed in column 1, these are cumulative payments. For instance, for accident year 1989, column 5 shows loss payments on direct and assumed business from January 1, 1989 through the statement date.

For the "prior years" row, the payments are those made only in the current calendar year. Thus, for the 1995 Annual Statement, these are the payments made from January 1, 1995 through December 31, 1995.

Columns 5 and 6 are net of salvage and subrogation received. Column 9 is for information only, a "memorandum" column, it is not used to calculate subsequent columns. [Note that column 11 equals columns 5 - 6 + 7 - 8 + 10; it does not involve column 9.] Salvage and subrogation is most material for automobile physical damage [Part II], though some carriers show significant amounts for automobile liability and workers' compensation as well.

Schedule P, Part I, shows cumulative paid losses by accident year. The "Underwriting and Investment Exhibit," Part 3, shows paid losses in the most recent calendar year. The NAIC cross-checks determine calendar year paid losses from the current Schedule P and that of the previous year, and compare these figures with those in the "Underwriting and Investment Exhibit."9

For the accident year to which losses are assigned, see the discussion below of occurrence versus claims-made business.5

Distribution of Unallocated Expenses

Allocated loss expense payments, such as defense counsel fees, are related to specific claims and can therefore be assigned to accident years. Unallocated expenses in column 10 are claims department overhead and salaries; they are assigned to accident year by formula. The Schedule P exhibits do not indicate whether the unallocated loss adjustment expense payments and reserves, as well as the salvage and subrogation received and anticipated, are gross or net of reinsurance. The Schedule P Instructions now say that all these figures are to be net of reinsurance.6

5. In practice, reinsurance treaties rarely cover unallocated loss adjustment expenses, so the direct figures generally equal the net figures.

6.
The fourth Schedule P Interrogatory describes the procedure.

The unallocated loss expense payments paid during the most recent calendar year should be distributed to the various years in which losses were incurred as follows: (1) 45 percent to the most recent year, (2) 5 percent to the next most recent year, and (3) the balance to all years, including the most recent, in proportion to the amount of loss payments paid for each year during the most recent calendar year. If the distribution in (1) or (2) produces an accumulated distribution to each year in excess of 10 percent of the premiums earned for such year, disregarding all distributions made under (3) such accumulated distribution should be limited to 10 percent of premiums earned and the balance distributed in accordance with (3).

The assumptions underlying this procedure are that:

- half of unallocated loss adjustment expenses are incurred when the claim is reported (costs of setting up files and initial investigations), and half are incurred when the claim is settled (costs of issuing checks and final negotiations), and
- 90 percent of claims are reported during the year when the accident occurred, and 10 percent are reported the following year.6

Thus, unallocated expenses related to claim reporting are assigned to the two most recent accident years in a 9 to 1 (or 45 to 5) allocation, and unallocated expenses related to claim settlement are allocated in proportion to loss payments.7

No fixed procedure is suitable for all lines of business. Many Products Liability claims are not reported until years after the accident date, and insurers providing this coverage spend much time negotiating settlements and handling the claims. The statutory distribution procedure assigns too much unallocated expenses to the

6. Since unallocated loss adjustment expenses are items such as salaries, travel, and claims department overhead, they are paid when incurred.

7. This distribution also assumes that the volume of losses closed equals the volume of losses reported. See Kittel (1983), as well as the discussion of his article by Richard Hill for the effects of exposure growth and inflation on the distribution of ULAE.
most recent years. Workers' Compensation permanent disability cases may have weekly indemnity payments extending over the disabled worker's lifetime, though most unallocated expenses are incurred when the claim is first reported and investigated. The statutory distribution procedure assigns too little unallocated expenses to the most recent years. It is difficult to determine the proper assignment of unallocated expenses to accident year, so the simple statutory procedure has endured.\textsuperscript{8}

Suppose the company has the following 1995 experience for a line of business, all of whose claims are settled within 3\textsuperscript{e} years, as shown in Table 1.

Calendar year 1995 unallocated loss adjustment expenses paid are $600,000. Forty-five percent of $600,000, or $270,000, is allocated to 1995, and 5 percent of $600,000, or $30,000, is allocated to 1994. The remaining $300,000 is allocated in the same proportion as paid losses. Table 2 shows the distribution of unallocated loss adjustment expenses to accident year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Earned Premium</th>
<th>Losses Paid in 1995</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>8,000</td>
<td>200</td>
</tr>
<tr>
<td>1992</td>
<td>8,500</td>
<td>500</td>
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<td>1993</td>
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<td>800</td>
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<td>1994</td>
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</tr>
<tr>
<td>1995</td>
<td>9,500</td>
<td>5,500</td>
</tr>
</tbody>
</table>

8. Because of the recent development of more accurate methods of estimating ULAE reserves based on claim reporting and settlement patterns, and the addition of Part 5 of Schedule P showing the claim count histories by line of business and accident year, the NAIC Casualty Actuarial Technical Task Force has suggested that the distribution procedure be changed from a mandatory method to a suggested method. The fourth Schedule P interrogatory would have an additional line, which would say:

An alternative method of distributing unallocated expense payments, or a component thereof, to years may be used if it would be more accurate than the above method.

In October 1995, the NAIC Blanks (EX4) Task Force rejected this proposed change.
### TABLE 2

<table>
<thead>
<tr>
<th></th>
<th>Losses Paid in 1995</th>
<th>Paid Loss percentage</th>
<th>Unallocated Expense Distribution:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Steps 1 &amp; 2</td>
</tr>
<tr>
<td>1991</td>
<td>200</td>
<td>3%</td>
<td>0</td>
</tr>
<tr>
<td>1992</td>
<td>500</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>1993</td>
<td>800</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>1994</td>
<td>2,000</td>
<td>34</td>
<td>30</td>
</tr>
<tr>
<td>1995</td>
<td>2,500</td>
<td>42</td>
<td>270</td>
</tr>
<tr>
<td>Total</td>
<td>6,000</td>
<td>100%</td>
<td>300</td>
</tr>
</tbody>
</table>

**Claim Count**

Column 12 shows the number of claims reported on direct and assumed business.\(^9\) Claim counts are shown for nine lines of business: Homeowners/Farmowners, Personal Auto Liability, Commercial Auto Liability, Workers' Compensation, Commercial Multi Peril, Other Liability, Medical Malpractice, Auto Physical Damage, and Products Liability. The losses reported to date (that is, paid losses plus case reserves) on direct and assumed business divided by the number of claims reported provides the average claim cost. A comparison of: 1) a carrier's trend in average claim cost by accident year for a given line of business with 2) either industry averages or inflation indices may help to identify deteriorating or improving books of business.

Claims may be counted either "per claim" (i.e., "per accident") or "per claimant." Automobile liability insurance illustrates the difference. It an insured driver causes an accident and injures three other persons, each of whom seeks Bodily Injury compensation, are there three claims or just one? Carriers may use either definition (but they must be consistent for all lines), and the choice must be reported in Question 7 of the Schedule P Interrogatories:

\(^9\) The NAIC Instructions uses different procedures for unallocated reinsurance and for pooling arrangements. "For pro-rata reinsurance, the number of claims reported should be equal to the full number of claims reported by the ceding carriers." (1995, p 215). "For carriers reporting on a pooling basis, the pooling percentage should be applied to claim count as well as dollar amounts" (1996, p 212).
7. Claim count information is reported (check one):
   (a) per claim ______
   (b) per claimant ______

Column 12 asks for the number of reported claims on direct and assumed business. The assumed business includes both voluntary experience and the experience assumed from the involuntary market reinsurance pools, such as the Workers' Compensation pools, Commercial Automobile CAPII plans, and automobile facility pools (as in Massachusetts).

The manner of counting claims on assumed business is confusing. If an insurer is a party to an intercompany pooling agreement, the pooling percentage is applied to claims as well as to premiums and losses. For instance, if the pooling agreement gives the company 40 percent of the consolidated premiums and losses, it is assigned 40 percent of the consolidated claims. The NAIC Instructions say: "For insurers reporting on a pooling basis, the pooling percentage should be applied to claim count as well as dollar amounts." (1995, p 212).

For other reinsurance arrangements, the NAIC Instructions say: "Under pro-rata reinsurance, the number of claims reported should be equal to the full number of claims reported by the ceding company." (1995, p 215). In other words, if the ceding company has a 40 percent pro-rata reinsurance treaty, and it has 1,000 reported claims, then the reinsurer also reports 1,000 claims. The rationale for this is that both the primary insurer and the reinsurer must handle these 1,000 claims.

Richard Roth's "clarification of the instructions" for Part 5 of the 1996 (and subsequent) Schedule P says:

All claim count information reported in Schedule P should be on a "direct and assumed" basis, and should reconcile. "Direct and assumed" means direct plus the proportion of a pool plus proportional reinsurance assumed. The same percentage used for dollar amounts should also be used for the claim counts.

In other words, (a) the claim count figures in Part 1, Part 3, and Part 5 should reconcile to each other, and (b) percentage amounts should be used for assumed proportional reinsurance. Moreover, Mr. Roth has informed the author that the current NAIC Instructions are misleading, and the claim counts for non-affiliated pro-rata re-
insurance should be a percentage of the ceding company’s figure, not equal to the “full number of claims.”

Loss and Loss Expense Reserves

Columns 18 through 23 show loss and loss expense reserves by accident year, valued as of the Statement date, separately for case and bulk reserves. Before 1989, Schedule P, Part 1E, showed IBNR reserves separately from case reserves. It was unclear whether the development on reported cases should be classified as IBNR or as case reserves, and insurers chose different definitions of IBNR. To avoid inconsistency among carriers, Schedule P divides reserves between (1) case and (2) bulk + IBNR. All formula reserves, whether for development on reported cases or emergence of unreported cases, comprise the “bulk + IBNR” reserves.

Many claims examiners set a single case reserve for a claim, for both loss and allocated loss adjustment expenses. Columns 17 and 18, case basis reserves for allocated loss adjustment expenses unpaid, would be zero for insurers using this practice. Zero entries in columns 17 or 18 are acceptable to the NAIC, as long as the appropriate bulk reserves are recorded in columns 19 and 20.

During the 1980s, most jurisdictions permitted reserves to be shown net of loss portfolio transfers. A loss portfolio transfer is a cession to another company by means of which:

- the ceding company’s surplus is increased,
- the transferee assumes losses already incurred, and
- the consideration is “derived from present value or discounting concepts.”

Accordingly, the 1986 Schedule P had an exhibit showing the company’s ceded and assumed loss portfolio transfers. The current Statement of Actuarial Opinion still requires the appointed actuary to comment on loss portfolio transfers.

In the early 1990s, the NAIC adopted the New York State statutory accounting principles, whereby loss reserve must be shown in all Annual Statement schedules and exhibits gross of any loss portfolio transfers. For instance, if the insurers transfers $10 million of loss reserves for a consideration of $8.5 million, the $10 million
of reserves continue to be carried on the primary company's statements and are taken down only as the losses are paid to claimants.

**Salvage and Subrogation Anticipated**

*Before 1991,* statutory accounting required insurers to hold loss reserves gross of anticipated salvage and subrogation, whereas GAAP statements showed reserves net of anticipated salvage and subrogation. For instance, if the company incurs an automobile collision claim with a loss reserve of $5,000, and the company expects to receive salvage of $2,000 on the damaged vehicle, then:

- In GAAP statements, the company set up a loss reserve of $3,000, whereas
- In statutory statements, the company set a loss reserve of $5,000, and it was permitted to recognize the salvage only when it was received.

The Internal Revenue Service bases taxable income on Annual Statement figures. The IRS allows only reserves net of salvage and subrogation anticipated as an offset to taxable income (see Rev. Proc. 91-48 1991-34 I.R.B. 1). It presumed that Schedule P reserves were gross of anticipated salvage and subrogation, and it mandated that insurers reduce these figures to a net basis.

For many insurers, the reserves in Schedule P were already net of anticipated salvage and subrogation. To avoid a double deduction for anticipated salvage and subrogation, with the corresponding overstatement of taxable income and of the federal income tax liability, the NAIC allowed insurers to report reserves net of anticipated salvage and subrogation for the 1991 and subsequent Annual Statements.

Column 21, "salvage and subrogation anticipated," is for information only (a memorandum column), like column 9 ("salvage and

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10. As Kert Saltman has pointed out to me, the major purpose of Part 2 of Schedule P is to show favorable or adverse loss development. If reserves are gross of anticipated salvage and subrogation, but payments are net of salvage and subrogation received, the Part 2 will show an apparent favorable development, because of the recognition of the salvage and subrogation at the time that it is received. Thus, reporting reserves net of anticipated salvage and subrogation improves the accuracy of the Schedule P retrospective test of reserve adequacy.
subrogation received.” Loss reserves in column 23 are already net of the anticipated salvage and subrogation amounts in column 21. In addition, a similar disclosure of anticipated salvage and subrogation must be made in the Statement of Actuarial Opinion Regarding Loss and Loss Adjustment Expense Reserves, paragraph 8(a).
Companies may use either of two practices in reporting anticipated salvage and subrogation:

- The case reserves in columns 13 and 14 may be shown net of anticipated salvage and subrogation.
- The case reserves may be shown gross of anticipated salvage and subrogation, and the anticipated amounts (or both reported and IBNR claims) may be an offset to the bulk reserves in columns 15 and 16.

**Distributing Unallocated Expense Reserves**

Schedule P contains no instructions for distributing unallocated loss adjustment expenses unpaid to accident year, as required for column 21. A simple procedure is to:

1. use the rationale for the distribution of unallocated expense payments,
2. assume that IBNR claims are paid in the year that they are reported, and
3. assume that the “bulk + IBNR” reserves consist of pure IBNR, not development on known cases.

If so, the unallocated expense reserves should be distributed in the same proportion as case reserves plus twice the IBNR reserves.\(^{11}\)

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\(^{11}\) Saltmann, 1980, pp 83-84, describes this procedure in more detail.

By combining the intent and arithmetic of the footnote to the schedule, the total unallocated LAE liability is the sum of two parts: (1) the liability for reported losses times the paid/paid ratio \(< 50\) percent, and (2) the IBNR liability times the paid/paid ratio \(< 100\) percent. These two calculations can be reduced to one: Unallocated LAE liability = 5 paid/paid ratio \(\times\) (Total loss liability + IBNR liability)."

Before 1989 the procedure for distributing unallocated loss adjustment expense payments to accident years was described in a footnote to Schedule P, Part I, not in the Annual Statement instructions. Saltmann’s paid/paid ratio is the ratio of “unallocated loss adjustment expense paid to losses paid for the most recent calendar year”.

As Ruti Saltmann has explained to me, “The method is not put forward on its own merits, rather, it is appropriate only because it is consistent with the assumptions...”
The latest two assumptions noted above are not entirely accurate: IBNR claims often have a long lag between report date and settlement date, so assumption 2 assigns too little unallocated expense reserves to recent years. Most carriers have case reserve development on reported cases, so assumption 3 also assigns too little unallocated expense reserves to recent years. Since there is no statutory prescription for this distribution, one should choose a procedure that seems most appropriate for the line of business.\textsuperscript{12}

\textbf{Loss Payment Patterns}

Inured losses, or paid losses plus the change in reported reserves, is an offset to statutory income. The 1986 Tax Reform Amendments, however, require insurers to discount loss and loss adjustment expense reserves when determining taxable income. In other words, paid losses plus the change in discounted reserves is the offset to taxable income.

The IRS loss reserve discounting procedures are based on \textit{Schedule P} data, with one must option relating to loss payment patterns available to companies. To effectively use this option and thereby

underlying the formula allocation of paid unallocated loss expenses by accident year. Thus, the model does not move than anticipate future formula allocations. Claim reporting and settlement patterns allow a better distribution of both paid and unpaid unallocated expenses by accident year, see the following footnote.

Johnson (1989) suggests another means of using claims emergence and settlement patterns to estimate the unallocated loss adjustment expense liability. She assumes that unallocated expenses are incurred over the life of the claim, with a double weighting during the year when the claim first is set up (though no heavier weighting when the claim is paid). Under this assumption, the distribution of unallocated expense reserves by accident year would give less weight to IBNR loss reserves with the exact weight depending on the duration of claims in the given line of business. Moreover, the appropriate distribution would depend on the relative trends for loss costs and unallocated expense as Johnson discusses in her paper.

\textsuperscript{12} Richard Fife suggests that “the ULAE reserve can be determined from claim counts data,” and he adds that the statutory formula for distributing paid ULAE is “an open topic for research.”

The statutory distribution of paid unallocated expenses by accident year assumes that 90 percent of claims reported as incurred in the current accident year, and 10 percent of these claims are incurred in the previous accident year. In truth, those percentages vary by line: in lines with slow claim emergence, such as Homeowners, a higher percentage of reported claims are incurred in the current accident year than in lines with slow claim emergence, such as Other Liability, for which the true ratio is about 75 percent. The actual claim emergence pattern by line may eventually re-}

plicate the 90 percent-10 percent split in the statutory formula.
optimize after-tax net income), companies must understand how the payment patterns are determined from Schedule P.

Discounted reserves are based on three factors:

1. The undiscounted reserves, as posted in Schedule P, Part 1, and grossed up (if necessary) for any discount in the figures, as long as the amount of the discount is disclosed in or with the Annual Statement.

2. The loss reserve discount rate, which is promulgated each year by the IRS, based on a 60 month rolling average of federal midterm interest rates. The discount rate is frozen for each accident year, and it is used until all losses from that accident year have been paid.

3. The loss payment pattern, which is determined in one of two ways:
   B. Individual companies with sufficient volumes of business may elect to determine loss payment patterns from their own Schedule P data.

Since the payment patterns affect income tax liabilities, many carriers compare their own patterns with those of the industry. In general, if reserves are projected to run off more quickly, then the reserve discount is smaller, the undiscounted reserves are larger, the offset to taxable income is larger, taxable income and the federal tax liability are smaller, and net after-tax income is larger.

In theory, one should use Part 3 of Schedule P to determine loss payment patterns. (The NAIC Instructions to Part 3 comment that: “the schedule format establishes payment patterns for cash flow projections, discounting calculations, and actuarial projections.”) The IRS does not use the Schedule P, Part 3, loss payment patterns.

13. An insurer may elect to use its own experience as long as its reserves for that line of business exceed those of at least 10 percent of taxpayers with reserves in that line of business. If it uses its own payment patterns, they must be recomputed each year, see the Internal Revenue Code, §846E(f).
Rather, it projects payment patterns from Part I ratios of paid to incurred losses by accident year.

The IRS procedure estimates the percentage of each accident year's reserves that will be paid in the coming calendar years. Suppose that the undiscounted reserve for accident year 1995 are $100 million. The loss payment patterns might say that these reserves will be paid over the coming six years, in the following proportions: 50 percent in 1996, 30 percent in 1997, 10 percent in 1998, 5 percent in 1999, 3 percent in 2000, and 2 percent in 2001.

The IRS discounting procedure assumes that losses are paid on July 1 of each year. If the discount rate for this accident year is, say, 7 percent per annum, then the discounted value of the losses paid in 1996 is \( \$100 \text{ million} \times 50 \text{ percent} \times (1.07)^{-1} \), the discounted value of the losses paid in 1997 is \( \$100 \text{ million} \times 30 \text{ percent} \times (1.07)^{-2} \), and so forth. The sum of all the discounted values is the present value of the 1995 reserve.

To estimate the percentage of the 1995 reserve that will be paid in calendar year 1996, the IRS discounting procedure examines the percentage of the 1994 reserve that was paid in calendar year 1995. Similarly, to estimate the percentage of the 1995 reserve that will be paid in calendar year 1997, the IRS discounting procedure examines the percentage of the 1993 reserve that was paid in calendar year 1995.

Since Part I of Schedule P shows cumulative loss payments, the needed figures discussed in the previous paragraph are not explicitly shown. Rather, Part I shows the cumulative percentage of each accident year's incurred losses that are paid through the statement date. Thus, one can determine the cumulative percentage of 1993 incurred losses that are paid through December 31, 1995, and the cumulative percentage of 1994 incurred losses that are paid through December 31, 1995. The difference between these two figures is the estimated percentage of 1993 incurred losses that are paid in calendar year 1995, which is the proxy for the percentage of an accident year's incurred losses paid between 24 months and 36 months after the inception of the accident year.

Table 3 below shows the derivation of the loss payment pattern from columns 11 and 27 of Schedule P, using simulated data for 14. This is similar to assuming that losses are paid evenly over the year. Although not exactly the same, it is a reasonable simplification.
<table>
<thead>
<tr>
<th>Accident Year</th>
<th>Paid Loss and Loss Expense</th>
<th>Incurred Loss and Loss Expense</th>
<th>Cumulative Paid/ Incurred Ratio</th>
<th>Incremental Paid/ Incurred Ratio</th>
<th>Adjusted Paid/ Incurred Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>203</td>
<td>977</td>
<td>20.82%</td>
<td>20.82%</td>
<td>20.82%</td>
</tr>
<tr>
<td>1994</td>
<td>466</td>
<td>945</td>
<td>49.28%</td>
<td>28.45%</td>
<td>28.45%</td>
</tr>
<tr>
<td>1993</td>
<td>543</td>
<td>872</td>
<td>62.18%</td>
<td>12.90%</td>
<td>12.90%</td>
</tr>
<tr>
<td>1992</td>
<td>600</td>
<td>851</td>
<td>70.46%</td>
<td>8.28%</td>
<td>8.28%</td>
</tr>
<tr>
<td>1991</td>
<td>589</td>
<td>761</td>
<td>77.42%</td>
<td>6.96%</td>
<td>6.96%</td>
</tr>
<tr>
<td>1990</td>
<td>577</td>
<td>716</td>
<td>80.58%</td>
<td>3.15%</td>
<td>3.15%</td>
</tr>
<tr>
<td>1989</td>
<td>470</td>
<td>562</td>
<td>83.65%</td>
<td>3.06%</td>
<td>3.06%</td>
</tr>
<tr>
<td>1988</td>
<td>437</td>
<td>572</td>
<td>85.30%</td>
<td>1.76%</td>
<td>1.76%</td>
</tr>
<tr>
<td>1987</td>
<td>489</td>
<td>588</td>
<td>87.73%</td>
<td>2.34%</td>
<td>2.34%</td>
</tr>
<tr>
<td>1986</td>
<td>465</td>
<td>518</td>
<td>89.39%</td>
<td>1.66%</td>
<td>1.66%</td>
</tr>
<tr>
<td>First Prior</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Second Prior</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Third Prior</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Fourth Prior</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Fifth Prior</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Sixth Prior</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>2.31%</td>
</tr>
</tbody>
</table>

TABLE 3
Loss Payments Pattern for Federal Income Taxes
(figures in millions of dollars)

long-tailed line of business.15 Tax year 1997, using data from the 1995 Annual Statement (as compiled in Best's Aggregates and Averages), is an IRS "determination year" for loss payment patterns. Column 2 and 3 in Table 3 are taken from columns 11 and 27 of Schedule P, Part 1: "total net losses and loss expenses paid" and "total net losses and loss expenses incurred." Column 4, which is the ratio of column 2 to column 3, is the cumulative percentage of incurred losses that are paid through the

15 For more complete treatments of the IRS reserve discounting method, see Glennon and Lenrow, 1987, pp 126-133, or Altmao and Ghetti, 1988, pp 144-161. An example of the loss reserve discounting procedure for Autorepair Liability from the U.S. Treasury Department Conference Report is reproduced in Appendix A (pp 187-189) of the Glennon and Lenrow paper; additional exhibits are provided by Altmao and Ghetti.
Statement date for each accident year. For instance, at the December 31, 1995, valuation, for accident year 1993 there were $872 million of incurred losses and $543 million of cumulative paid losses and ALAE, so the cumulative paid ratio at 36 months from inception of the accident year (1/1/93 to 12/31/95) is 62.18 percent.

Column 5 is the incremental paid percentage, or the amount assumed paid in each 12-month interval. For instance, the 36-month cumulative paid ratio in the exhibit is 62.18 percent and the 48-month ratio is 70.46 percent, so the percent assumed to be paid between 36 months and 48 months from inception of the accident year is 8.28 percent, as shown in the fourth row of column 5.

Schedule P shows only ten accident years. Payment patterns in the long-tailed commercial lines of business, such as workers' compensation, medical malpractice, other liability, and products liability, often extend for thirty or forty years. Accordingly, if the cumulative percent paid is less than 100 percent at the 10th year, the payment pattern is extended for up to an additional six years until 100 percent is reached. Payments in the 11th through the 15th years ("first prior" through "fifth prior" in the exhibit) are capped at the 10th year figure; the 16th year figure is not capped (column 6).

In the table, 89.49 percent of incurred losses are presumed paid by the end of the tenth year; the remaining 10.61 percent must be spread to additional years. The "incremental paid to incurred ratio" in the tenth year is 1.66 percent, so the presumed paid percentages in the 11th through the 15th years are also limited to 1.66 percent. At the end of the 15th year, 2.31 percent remains unpaid, so this entire amount is put in the 16th year (or "sixth prior") year.16

In general, a slower loss payment pattern reduces the tax reduction for incurred losses and increases taxable income; a quicker payment pattern decreases taxable income. (The actual effects depend on the discount rate and the incurred losses in each year.) The apparent speed of the IRS loss payment pattern depends on both: (a) the actual loss payment rate and (b) the relative adequacy of the incurred losses repaced in Schedule P. A carrier may compare its own Schedule P experience with the industry experience published.

16. There are numerous other indications in the derivation of the IRS loss payment pattern, such as the treatment of negative incremental paid to incurred ratios, which are beyond the purview of this paper.
in Best's Aggregates and Averages to optimize its after-tax net income.

Claims Outstanding

Column 24 shows the number of claims outstanding on direct and assumed business. The ratio of case reserves either column 13 or the sum of columns 13 and 17 to column 24 shows the average value of an outstanding claim. This ratio must be examined with caution, for two reasons:

1. Lines such as Workers' Compensation, Automobile No-Fault, and Accident & Health provide periodic payments during the duration of a disability. The case reserves show only the remaining unpaid losses, not the entire benefits, so the ratio noted above understates the value of an outstanding claim.

2. Loss development on reported cases is included in the bulk reserves shown in column 15, not in the case reserves of column 13. [One can not include column 15 in calculating the average value, since this column includes IBNR reserves, and IBNR claims are not included in column 24.] If there is significant loss development on reported cases, then the ratio noted above understates the value of an outstanding claim.

Loss Ratios

Columns 25 through 30 are calculated figures. Column 25, "Total losses and loss expenses incurred, direct and assumed," equals the sum of columns 5, 7, 10, 13, 15, 17, 19, and 22. Column 26 (ceded) equals the sum of columns 6, 8, 14, 16, 18, and 20. Column 27 (net) equals column 25 minus column 26, or the sum of columns 11 and 23. Columns 28 through 30, "Loss and loss expense percentage [Incurred / Premiums Earned]" for direct and assumed, ceded, and net business are the ratios of columns 25 through 27 to columns 2 through 4, respectively. The ratios in column 30 affect the computation of excess statutory reserves in the Schedule P interrogatories, which is carried over to Page 3, "Liabilities, Surplus and Other Funds," line 14 (see below).

Industry-wide averages by line of business of column 30 are used to determine the written premium risk-based capital charge. The
individual company's average loss ratio by line of business in column 30 is used to compute the company adjustment for the written premium risk-based capital charge.\textsuperscript{17}

**Interest Discount**

Columns 31 and 32 show the "discount for the time value of money" for losses and loss adjustment expenses, respectively. These columns show non-tabular discounts only, and they enable a reconciliation of the Schedule P figures with the entries in the Underwriting and Investment Exhibit.

There are two types of loss reserve discounts: tabular discounts and non-tabular discounts. Tabular discounts are discounts based upon a mortality or morbidity table. Under statutory accounting, they may be applied only to the indemnity [i.e., wage replacement] portion of workers' compensation pension cases or to long-term disability claims. [This is similar to the reserve valuation for an immediate annuity, except that the beneficiary is a disabled life.] Non-tabular discounts are determined from the aggregate payment patterns of the book of business.\textsuperscript{18}

The treatment of discounting in the Annual Statement exhibits and schedules is as follows:

- **Loss and expense reserves on the balance sheet** (page 3) and in the Underwriting and Investment Exhibit (pages 9, 10, and 11) and net of both tabular and non-tabular discounts.
- **Schedule P, Part 1**, is not of tabular discount and gross of non-tabular discount. In order to reconcile Part 1 of Schedule to the rest of the Annual Statement, only non-tabular discounts are disclosed in columns 31 and 32.

\textsuperscript{17} The risk-based capital charges are discussed in detail by Sholom Feldblum in "Risk-Based Capital Requirements" (third edition, 1996, CAS Part 10 examination study note, forthcoming in the Proceedings of the CAS).

\textsuperscript{18} Non-tabular loss reserve discounting is permitted in statutory financial statements in several jurisdictions (see, for instance, the Massachusetts Insurance Code, § 12. "Computation of Reserves of Liability Companies," paragraph 2: "For all compensation claims under policies written more than three years prior to [the Statement] date, the present values at the per cent interest of the determined and the estimated future payments"). and (3) when authority for discounting is granted by the State Insurance Department in special circumstances.
Schedule P, Parts 2 and 4, are gross of both tabular and non-tabular discounts. The only reconciliation between Part 1 of Schedule P and Parts 2 and 4 of Schedule P is in the Note to the Financial Statements titled "Discounting of Liabilities for Unpaid Losses and Unpaid Loss Adjustment Expenses" [Note 19 in 1995].

The "amortization of discount," or the "unwinding of the interest discount," shows up as apparent adverse loss development. Part 2 of Schedule P is intended to show true adverse loss development, so it is reported gross of all discounts.

For lines of business which do not have tabular discounts (that is, for all lines except workers' compensation and accident & health), the reconciliation between Part 1 and Part 2 of Schedule P is as follows: for each accident year, Part 1, columns 27 - 22 - 10, equals Part 2, column 11. In other words, net incurred losses and loss adjustment expenses by accident year [Part 1, column 27] minus unallocated loss adjustment expense reserves (column 22) minus cumulative unallocated loss adjustment expenses paid (column 10) equals net incurred losses and allocated loss adjustment expenses [Part 2, column 11]. This reconciliation does not work for lines of business that have tabular discounts.

Intercompany Pooling

Column 33 shows the intercompany pooling participation percentage, if applicable. Member companies of an insurance group often redistribute premiums, losses, and loss adjustment expenses according to participation formulas. Column 33 shows the individual company's share of the group figures.

The Instructions to the Annual Statement (1995, p. 213) say, "The pooling percentage is to reflect the Company's participation in the pool as of year-end." If an insurance group modifies the pooling arrangement, there may be an apparent change in the incurred or paid loss development because of the intercompany agreement, not because of different claims handling or reserving procedures. Therefore, "any retroactive change in pooling participation will require appropriate restatement of Schedule P."

The individual company historical figures in the current Schedule P will not necessarily agree with the entries of previous years.
For instance, suppose a member company of an insurance group received 40 percent of the entire group’s revenues and paid 40 percent of the group’s losses and expenses in 1993. In 1995, its pooling participation changed to 70 percent. Leaving the original 40 percent participation figures for 1993 and 1994 would distort the loss development patterns; its loss payments and reserves were 40 percent of the group total in 1993 and 1994, but its payments and reserves were 70 percent of the total in 1995. Its loss triangles would show large jumps in both payments and reserves between 1994 and 1995. To facilitate the use of the loss development patterns, the company should restate all past figures to a 70 percent participation percentage.

Columns 34 and 35 show the effect of the discount for the time value of money on the loss and loss adjustment expense reserves. If no discount is used, column 34 equals columns 18 – 14 + 15 – 16, and column 35 equals columns 17 – 18 + 19 – 20 + 22. If a discount is used, then these sums should be netted with the discount figures in columns 31 and 32 to obtain columns 34 and 35.

### Occurrence and Claims-Made Business

In 1993, the old claims-made business exhibit was removed from Schedule P, three lines of business were segmented into occurrence

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19. The need for loss triangles to forecast accurately future development argues for even more comprehensive restatements of past experience. For instance, suppose an insurer formed a new subsidiary in 1990 and gave it 40 percent of its pooled business. Premiums and losses for this subsidiary were zero in 1986 through 1989, so the company did not yet exist. But if the parent company gets 100 percent of the business from 1986 through 1989 but only 50 percent in 1990 through 1995, its loss development triangles will be distorted. Richard Roth has informed me that the subsidiary should be given 40 percent of the business for all years, even when it is not yet.

For reinsurance committies, treaty committations affect the reported loss development patterns, as David Lyon has pointed out to me. The same logic would indicate that both the ceding and assuming carriers should restate their experience after a treaty committation. But carriers frequently commute individual claims in addition to whole treaties, such as lifetime pension claims in Workers’ Compensation, long term disability claims in Accident and Health insurance, and structured settlements in Other Liability. The analyst completing Schedule P is rarely aware of these committations, and restating past history is an onerous task. When a committation affects the loss development patterns, the effects should be disclosed in a paragraph of the Schedule P introduction. Stephen Lowe has noted that similar problems exist for primary companies when their insurers become insolvent.
and claims-made portions, and the disclosure of extended loss and expense reserves was put into a Schedule P interrogatory. The following paragraphs cover the definition of claims-made business, the reporting of the accident date, the treatment of tail coverage, the meaning of extended loss and expense reserves, and the risk-based capital reasons for the segmentation of claims-made business.

Occurrence policies provide coverage for injuries that occur during the policy period, regardless of when the claims are reported. Claims-made policies provide coverage for accidents that are reported during the policy period, as long as they occurred subsequent to the "retroactive date," or the date that claims-made coverage was first issued to the policyholder. The most common use of claims-made coverage is for medical malpractice or other professional liability insurance.

If a physician insured under a claims-made program switches to another carrier, the first insurer will not indemnify claims that are reported after the switch to the second insurer and the second insurer will not indemnify claims that occurred while the physician was covered by the first insurer. To cover claims that occur during the claims-made period with the first insurer but are reported subsequent to its termination, the physician may purchase "tail coverage" from the first insurer. The tail coverage covers claims that occur during the claims-made period but are reported after its termination. Tail coverage is also used if the physician leaves his or her practice and no longer needs full insurance coverage.

If a physician stops practicing because of retirement, disability, or death, he or she (or the estate) still needs tail coverage for late reported claims. To avoid burdening the retired or disabled physician (or the estate) with the heavy costs of tail coverage, some insurers spread this cost over the term of the claims-made coverage and provide free tail coverage in the event of retirement, disability, or death.

For instance, suppose that the cost of claims-made coverage for a certain physician is $10,000 a year. The insurer may charge $12,000 a year, promise free tail coverage in the event of retirement, disability, or death, and use the extra $2,000 a year to build up a reserve for this coverage. This is not a loss reserve, so it need not be shown in the Schedule P exhibits. [No losses have yet been incurred.] Rather, it is akin to life insurance policy reserves, or to an active life reserve in disability insurance. It would be shown on the insurer's balance sheet, as a write-in line on page 3, but there is no exhibit in the
property-casualty Annual Statement that discloses it. Therefore, these extended loss and expense reserves by lines of business [for medical malpractice, other liability, and products liability] and by accident year are shown in the second Schedule P interrogatory.

Claims-Made Business: Reporting Procedures

The reserving risk and written premium risk charges in the risk-based capital formula are determined from Schedule P information. Reserving risk is the risk that unanticipated events may increase the company’s obligations for past claims above the amounts expected at the Statement date.

This “adverse loss development” may result from two causes: [a] the emergence of late reported claims, or “IBNR emergence,” and [b] increases in the loss estimates for reported claims, or “development on known claims.” Since claims-made business has no IBNR emergence, it should show less unexpected adverse loss development, so it needs a smaller reserving risk charge.

To properly quantify the difference in adverse loss development between occurrence and claims-made business, in 1999 the NAC segmented the Schedule P exhibits by three lines of business into occurrence and claims-made portions. These three lines—medical malpractice, other liability, and products liability, include almost all the claims-made business written in the property-casualty insurance industry.20

Tail coverage is used with claims-made policies, but it is more similar to occurrence coverage, particularly with regard to adverse loss development. Like occurrence policies, it covers losses which occur during a certain period, regardless of when they are reported. Therefore, tail coverage is included in the occurrence exhibits, not the claims-made exhibits.

The caption of Part 1, column 1, says “Years in which premiums were earned and losses were incurred,” and the captions in Parts 2 through 6 are similar. Part 7 uses policy year experience, so its cap-

20. Proceedly, there is a 20 percent “claims-made” offset to the reserving risk and underwriting risk charges in the risk-based capital formula for medical malpractice business only. The industry Schedule P experience will be analyzed to judge the appropriateness of this offset and to determine whether similar effects should be used for other liability and for products liability.
tion is different. There is no reference to "accident year" in the column caption. The date when the losses are incurred means the date the insurer incurs the obligation for the loss under the coverage provided by the contract, so it differs by type of policy:

- For occurrence policies, this is the date that the loss occurs.
- For claims-made policies, this is the date that the loss is reported to the insurer.
- For tail coverage, this is the date that the policy is issued.
- For fidelity and surety, this is the date that the loss is discovered.\(^2\)

For instance, suppose an accident covered by a medical malpractice policy occurs in 1993 and is reported in 1997. If the physician had:

- an occurrence policy in 1993, this loss is recorded in Schedule P as an accident year 1993 loss.
- claims-made coverage from 1993 through 1997, this loss is recorded in Schedule P as an accident year 1997 loss.
- claims-made coverage from 1993 through 1995, and then pur chased tail coverage on December 31, 1995, this loss is recorded in Schedule P as an accident year 1995 loss.

**Excess Statutory Reserves**

It is difficult to estimate required reserves for immature accident years in long tailed lines of business. Paid loss ratios remain low for several years after the policy period, and optimistic reserving may underestimate ultimate losses. The NAIC therefore requires additional reserves for immature accident years in certain lines of business when the statement reserves seem low.

These *excess statutory reserves* are determined by formula. Two procedures are used: one for the long tailed liability lines of business, and one for credit insurance.

---

2. For instance, a fidelity bond may cover embezzlement by an employee from the insured corporation. If embezzlement occurred in 1993 but it is not discovered until 1995, the loss is coded to the 1995 accident year.
Excess Reserves—Long-Tailed Lines

Excess statutory reserves are calculated for the liability lines: Automobile Liability (Personal plus Commercial), Other Liability plus Products Liability, Workers’ Compensation and Medical Malpractice. The occurrence and claims-made portions of medical malpractice, other liability, and products liability must also be combined before computing the excess statutory reserves.

The formula uses net earned premium (Part 1, Column 4) and net loss ratios (Part 1, Column 30) for the most recent eight years. If the most recent three accident years do not meet a minimum loss ratio criterion, additional reserves must be held by the company. These reserves are shown in the Schedule P intercompany and on the “Liabilities, Surplus and Other Funds” section of the balance sheet, page 3, line 14: “Excess of statutory reserves over statement reserves.”

The minimum loss ratio criterion is determined by a combination of historical experience and regulatory standards. The net loss ratios in column 30 for the five accident years immediately preceding the three most recent accident years are examined. Accident years that have less than $1 million in net earned premium (column 4) are discarded. If at least three accident years remain, then the lowest loss ratio among these years is the minimum loss ratio criterion. The minimum loss ratio is capped between 60 percent (65 percent for Workers’ Compensation) and 75 percent. If fewer than three accident years have at least $1 million in net earned premium, then 60 percent (65 percent for Workers’ Compensation) is the minimum loss ratio.

If the net loss ratios reported in the three most recent accident years are at least as great as the minimum loss ratio, no excess reserves are needed. Otherwise, additional reserves must be carried by the company to bring the net loss ratios in the three most recent years up to the minimum loss ratio. The calculation is performed separately for each of the three most recent accident years.

22 The NAIC instructions add: “If the company has permission from its state of domicile to discount loss and loss expense reserves, the company should compute the excess of statutory reserves over statement reserves using its discounted loss and loss expense reserves rather than the undiscounted reserves” (1995, p. 22). In other words, a company may not use discounted reserves in its statement reserves but undiscounted reserves to avoid the excess of statutory reserves.
An illustration should clarify this procedure. Table 4 shows workers' compensation net earned premium, incurred losses, and loss ratios for the most recent eight accident years for a simulated 1995 Schedule P, Part 1D.

The minimum statutory loss ratio is determined from the experience of accident years 1988 through 1992. Accident year 1988 is not considered, since its earned premium is less than $1 million. The lowest reported loss ratio in accident years 1989 through 1992 is 70 percent. The reported loss ratios for accident year 1993 exceed 70 percent, so no additional reserves are required. The 65 percent reported loss ratio in 1994 is lower than the 70 percent minimum, so $70,000 of excess statutory reserves (= 5 percent of $1,400,000) is needed. Similarly, the 60 percent reported loss ratio in 1995 is lower than the 70 percent minimum, so $150,000 of excess statutory reserves (= 10 percent of $1,500,000) is needed. The total workers' compensation excess of statutory over statement reserves shown in the Schedule P interrogatories and carried to page 3, line 14, is $220,000.

Note the rationale in this example. The company's workers' compensation experience was poor from 1989 through 1991, as was true for the industry as a whole. In the first half of the 1990s, industry results improved markedly, and loss ratios declined. Since workers' compensation is a slow developing line, the declining loss ratio may reflect reserve weakening, which the "Schedule P reserve penalty" attempts to correct.

This analysis can be misleading if there are significant premium rate level changes or benefit reforms that reduced expected losses, as was true for workers' compensation in the early 1990s. There is much debate within the actuarial and regulatory communities.

### TABLE 4

<table>
<thead>
<tr>
<th>Accident Year</th>
<th>Net Earned Premium</th>
<th>Net Incurred Loss</th>
<th>Net Loss Ratio</th>
<th>Accident Year</th>
<th>Net Earned Premium</th>
<th>Net Incurred Loss</th>
<th>Net Loss Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988</td>
<td>$950,000</td>
<td>$603,000</td>
<td>64.0%</td>
<td>1992</td>
<td>$1,200,000</td>
<td>$840,000</td>
<td>70.0%</td>
</tr>
<tr>
<td>1989</td>
<td>1,100,000</td>
<td>825,000</td>
<td>75.0</td>
<td>1993</td>
<td>1,250,000</td>
<td>878,500</td>
<td>71.0</td>
</tr>
<tr>
<td>1990</td>
<td>1,150,000</td>
<td>920,000</td>
<td>80.0</td>
<td>1994</td>
<td>1,400,000</td>
<td>910,000</td>
<td>65.0</td>
</tr>
<tr>
<td>1991</td>
<td>1,100,000</td>
<td>793,000</td>
<td>72.0</td>
<td>1995</td>
<td>1,500,000</td>
<td>900,000</td>
<td>60.0</td>
</tr>
</tbody>
</table>
whether the advantages of the Schedule P penalty outweigh its flaws.26

Excess Reserves—Credit Insurance

The excess statutory reserves for credit insurance do not depend on historical experience. Rather, the excess reserves are determined as follows:

- For policies in force on the statement date, the excess statutory reserve equals 50 percent of the premiums earned on these policies minus the losses incurred (both payments and reserves), the excess reserves may not be less than zero.
- For policies that expired in the fourth quarter of the most recent year, the excess statutory reserve equals 50 percent of the premiums written on these policies minus the losses incurred (both payments and reserves), the excess reserves may not be less than zero.
- For other credit insurance policies, no excess statutory reserves are needed.

Auxiliary Exhibits

Schedule P provides several historical triangles for each line of business: three loss triangles, three claim count triangles, and two premium triangles.

- Part 2 shows net incurred losses and ALAE,
- Part 3 shows net paid losses and ALAE,
- Part 4 shows net bulk reserves for losses and ALAE,
- Part 5 shows direct and assumed (a) claims closed with loss payment, (b) claims outstanding, and (c) claims reported, and

26. The usefulness of the Schedule P statutory reserve formula is unclear. The Actuarial Services Division of the North Carolina Department of Insurance and the NAIC Casualty Actuarial Task Force have been exploring possible enhancements to this procedure (Munna, 1990; Harrison, 1995; Salomon [1992] suggests an alternative statutory reserve test, see also the reviews of her article by Rodermund and Trist.)
Part 6 shows exposure year earned premiums (a) direct and assumed and (b) ceded.

The incurred losses in Part 2 are the sum of paid losses, case reserves, and bulk reserves. A triangle of case incurred losses, or paid losses plus case reserves [often termed reported losses], can be formed as the Part 2 triangle minus the Part 4 triangle. A triangle of outstanding case reserves can be formed as the Part 2 triangle minus the Part 4 triangle minus the Part 3 triangle.

Each loss triangle includes allocated loss adjustment expenses, but not unallocated loss adjustment expense. The Underwriting and Investment Exhibit does not differentiate between allocated and unallocated loss adjustment expenses. Rather, the combined unpaid loss adjustment expenses are shown by line of business on page 11, column 6. The division between allocated and unallocated loss adjustment expenses by line of business can also be found in the Insurance Expense Exhibit, columns 5 and 6, in both Part 2 [net business] and Part 3 [gross business].

In 1997, the NAIC is scheduled to adopt a new definition of allocated loss adjustment expenses, based on the nature of the expense, and not on an "inside-outside" dichotomy. For instance, legal defense costs, if associated with particular claims, will be coded as allocated expenses, regardless of whether in-house counsel or independent attorneys are used. This may cause some distortion of the development triangles, depending on the magnitude of the adjustment expenses and the effect of the new definition.

The historical loss triangles show net experience, or direct plus assumed business minus ceded business. Historical triangles of direct plus assumed business only can be formed by combining Annual Statements of successive years, using figures from Schedule F, Part 1. For instance, in March 1996 one can compile historical development exhibits of direct plus assumed business for seven accident years from the 1989 through 1995 Schedule P's, using columns 5, 7, 13, 15, 17, and 19 of Part 1.

The claim count triangles in Part 5 show direct plus assumed experience. The claim count columns in Part 1 and Part 3 are also direct plus assumed experience, that is, net claim counts are not shown in Schedule P.

The exposure year premium triangles in Part 6 show direct plus assumed and ceded experience separately. Net experience is the difference between these triangles.
Several other items are shown in the Schedule P auxiliary exhibits. Part 2 shows one and two year loss developments for all lines of business. Part 3 shows the number of claims closed, with and without loss payments, for nine lines of business. The paid loss triangles in Part 3 are the easiest to compile than the insured loss triangles in Part 2, so we begin the discussion with Part 3.

Part 3—Paid Losses

Part 3 shows cumulative paid losses and allocated loss adjustment expenses by accident year and evaluation date. The same accident years are shown as in Part 1: 10 years for the long-tailed (mostly liability) lines of business, two years for the short-tailed lines, and the appropriate segmentation for reinsurance business. Nevertheless, 10 years of data must be gathered for all lines of business, since they are included in the 10-year Part 3 Summary table.

The paid loss figures can be derived from Schedule P, Part 3, of the prior Annual Statement and Part 1 of the current Annual Statement. Historical data for individual accident years — that is, all figures except those in the first row ("prior years") and the right-most column ("current valuation") — are unchanged from those in the previous year’s Part 3. The figures in the right-most column must equal the difference between Column 10 and 11 in Part 1, except for the prior line entries. Note that Part 1, Column 11, includes all loss and loss expense payments, whereas Part 3 shows only loss and allocated LAE payments. Thus, unallocated LAE payments, or Part 1, Column 10, must be subtracted from Part 1, Column 11.

The "Prior" Line

The Part 3 “prior years” entries can be obtained from the previous year’s Annual Statement, after a suitable modification of the figures. Suppose you are completing the 1995 Schedule P, using data (when

34. Before 1989, the Schedule P historical triangles included both allocated and unallocated loss adjustment expenses. This format was criticized on the grounds that the statutory distribution of unallocated loss adjustment expenses to accident year is arbitrary and lessens the usefulness of the historical loss triangles, see Ottson, 1987.
appropriate from the previous year. Take the “prior” and “1985” rows from the 1994 Schedule P, subtract from each figure in these two rows the cumulative paid losses and ALAE through 1986, then add the two rows. Discard the cumulative paid losses and ALAE through 1985 (which is now negative), keep the next entry (a zero) as the first figure in the new prior line, and enter the remaining figures in the rest of the row. For the last figure in the row, add the calendar year 1995 paid losses and ALAE for accident years prior to 1986 to the last cumulative total. The calendar year 1995 paid losses and ALAE for accident years prior to 1986 are shown in the 1995 Schedule P, Part 1, column 11 minus column 10, “prior” row.

An illustration should clarify this procedure. Suppose the 1994 Schedule P, Part 3, contains the following entries for one line of business:

<table>
<thead>
<tr>
<th>TABLE 5</th>
<th>1994 Schedule P, Part 3, First Two Rows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior</td>
<td>0</td>
</tr>
<tr>
<td>1985</td>
<td>375</td>
</tr>
</tbody>
</table>

Assume that in the 1995 Part 1 exhibit for this line of business, the “prior years” row shows $23 thousand in column 11 (“Total net paid”) and $2 thousand in column 10 (“Unallocated loss expense payments”).

To complete the 1995 Part 3 exhibit, the cumulative payments through 1986 are subtracted from the first two rows in the 1994 Part 3 exhibit. In the example, $220 thousand is subtracted from the 1994 “prior years” row and $600 thousand is subtracted from the second row, giving the following:

<table>
<thead>
<tr>
<th>TABLE 6</th>
<th>Adjustments to the 1994 Part 3 “Prior” Line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior</td>
<td>0</td>
</tr>
<tr>
<td>1985</td>
<td>-225</td>
</tr>
</tbody>
</table>
The two rows are summed, and the 1985 column is dropped, as shown in Table 7:

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior</td>
<td>0</td>
<td>180</td>
<td>280</td>
<td>355</td>
<td>405</td>
<td>440</td>
<td>490</td>
<td>515</td>
<td>535</td>
</tr>
</tbody>
</table>

The 1995 payment is the difference between column 11 and 10 in Part 1. For the "prior years" row, this is $23,000 - $2,000, or $21 thousand. This figure is added to the cumulative payments through 1994 in Part 3 to give the cumulative payments through 1995, or $556 thousand.

**Loss Reserve Adequacy—Prospective Valuation**

Part 3 is particularly useful for prospective evaluations of loss reserve adequacy, since it is not dependent upon company reserving policies. It is most effective for short and medium tailed lines, where there are substantial loss payments in the first year or two, and claims settlement rates are stable; examples are Personal Automobile Liability and Workers’ Compensation. It is less useful for extremely long tailed lines, when the proportion of loss payments is small in the first year or two, and claims settlement rates may fluctuate; examples are Products Liability and Nonproportional Reinsurance. Financial analysts often evaluate an insurer’s reserve adequacy by means of a paid loss development of data from Schedule P, Part 3 (see Cholnoy and Cohen, 1991).

The format of a paid loss development analysis is as follows: Link ratios, or the ratios of cumulative paid losses at one valuation to cumulative paid losses at the preceding valuation, are calculated for each accident year and valuation date. A prospective link ratio is determined from the historical link ratios in each column.

---

No uniform procedure for determining prospective link ratios is appropriate for all lines and companies. One common approach is to use the average of the most recent three to five link ratios, adjusted for random outliers and known or suspected trends. These prospective link ratios show the expected development between adjoining valuation points. Development factors from each valuation point to 10 years of maturity are the cumulative products of the adjoining link ratios. For example, the development factor from six to 10 years is the product of the link ratios from (a) six to seven years, (b) seven to eight years, (c) eight to nine years, and (d) nine to 10 years.

We illustrate this procedure with simulated data for a long-tailed line of business. Exhibit 8 shows the Part 3 entries as they would appear in the 1995 Schedule P, for accident years 1986 through 1995.

**Paid Loss Link Ratios**

Paid loss link ratios are the ratios of: 1) cumulative paid losses for a specific accident year at a given valuation date to 2) cumulative paid losses for the same accident year at a valuation date one year earlier. For instance, the paid loss link ratio from two years to three years for accident year 1992 is $463 thousand divided by $343 thousand, or 1.35. The complete set of link ratios is shown in the table below.

Note: that we have rotated the triangle, turning diagonals into columns. The second column in Table 8 shows cumulative paid

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**Table 8**

1995 Schedule P, Part 3 ($000)

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>103</td>
<td>226</td>
<td>294</td>
<td>334</td>
<td>363</td>
<td>384</td>
<td>398</td>
<td>412</td>
<td>422</td>
<td>433</td>
</tr>
<tr>
<td>1987</td>
<td>111</td>
<td>238</td>
<td>309</td>
<td>356</td>
<td>387</td>
<td>409</td>
<td>428</td>
<td>442</td>
<td>454</td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>108</td>
<td>221</td>
<td>286</td>
<td>328</td>
<td>354</td>
<td>375</td>
<td>391</td>
<td>403</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1989</td>
<td>111</td>
<td>238</td>
<td>311</td>
<td>337</td>
<td>357</td>
<td>392</td>
<td>416</td>
<td>434</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>135</td>
<td>299</td>
<td>394</td>
<td>458</td>
<td>504</td>
<td>534</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1991</td>
<td>146</td>
<td>314</td>
<td>418</td>
<td>490</td>
<td>543</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1992</td>
<td></td>
<td>159</td>
<td>343</td>
<td>463</td>
<td>546</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td></td>
<td>146</td>
<td>353</td>
<td>485</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>1994</td>
<td></td>
<td></td>
<td>152</td>
<td>406</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1995</td>
<td></td>
<td></td>
<td></td>
<td>156</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
amounts on December 31, 1986. The second column in Table 9 shows paid loss development from 1 year after the inception of the accident year to 2 years after the inception of the accident year. In other words, each column of Table 9 is the ratio of two diagonals in Table 8.

No link ratio is calculated for the 1995 accident year, since there is only one valuation. No link ratios are shown for the "prior years" row, since the time since inception of the accident year differs depending on the policy.

We determine averages of the most recent three and the most recent five link ratios, and select prospective factors from the historical figures and expectations about future conditions. In this illustration, the selected link ratios lie between the three and five year averages.

**Paid Loss Development Factors**

The cumulative link ratios, or paid loss development factors, are the cumulative products of the appropriate "one year" link ratios. For instance, the cumulative link ratio from seven to 10 years, or 1.08, is the product of 1.33, 1.03, and 1.02, which are the link ratios from seven to eight, eight to nine, and nine to 10 years.

The losses paid to date are taken from the last column of Table 8: $156 thousand is the accident year 1995 paid losses, $406 thousand is the accident year 1994 paid losses, and so forth. The 1995

<table>
<thead>
<tr>
<th>TABLE 9</th>
<th>1995 Schedule P, Paid Loss Link Ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 m 2</td>
</tr>
<tr>
<td>1986</td>
<td>2.19</td>
</tr>
<tr>
<td>1987</td>
<td>2.14</td>
</tr>
<tr>
<td>1988</td>
<td>2.04</td>
</tr>
<tr>
<td>1989</td>
<td>2.14</td>
</tr>
<tr>
<td>1990</td>
<td>2.21</td>
</tr>
<tr>
<td>1991</td>
<td>2.15</td>
</tr>
<tr>
<td>1992</td>
<td>2.16</td>
</tr>
<tr>
<td>1993</td>
<td>2.42</td>
</tr>
<tr>
<td>1994</td>
<td>2.67</td>
</tr>
<tr>
<td></td>
<td>1 to 2</td>
</tr>
<tr>
<td>----------------</td>
<td>--------</td>
</tr>
<tr>
<td><strong>Averages</strong></td>
<td></td>
</tr>
<tr>
<td>3 yr</td>
<td>2.42</td>
</tr>
<tr>
<td>5 yr</td>
<td>2.32</td>
</tr>
<tr>
<td><strong>Select</strong></td>
<td>2.35</td>
</tr>
<tr>
<td><strong>Cumulative</strong></td>
<td>4.83</td>
</tr>
<tr>
<td>Paid to date</td>
<td>158</td>
</tr>
<tr>
<td>Developed</td>
<td>754</td>
</tr>
<tr>
<td>Ultimate</td>
<td>830</td>
</tr>
<tr>
<td>Incurred</td>
<td>898</td>
</tr>
</tbody>
</table>

paid losses are at one year of maturity and are therefore placed below the development factor for one to 10 years. (Similar placement is used for paid losses of other accident years.) The next row in Table 10 shows losses developed to ten years of maturity.

**Paid Loss Tail Factors**

In several long-tailed lines of business, payments continue after 10 years. The percent of losses still unpaid after 10 years may be estimated either: 1) by a comparison of Parts 2 and 3, or 2) from aggregate industry data:

1. Compare Part 2, row 2, column 11 (incurred losses for the first listed accident year at the latest valuation) with Part 3, row 2, column 11 (cumulative paid losses for the first listed accident year at the latest valuation). The ratio of these entries shows the percentage of incurred losses paid within 10 years. This procedure is sensitive to random loss fluctuations, however, since it uses one ratio to determine a development factor that affects all accident years. The ratio is influenced by the mix of open claims after 10 years in a particular block of business, and it may not be indicative of future payment patterns.
2. Use an expected ratio of ultimate losses to cumulative paid losses, based upon both industry averages and the characteristics of the insurer’s business. For this illustration, we have selected a final link ratio of 1.10.26

The “ultimate” losses in Exhibit 10 are the developed losses increased by 10 percent. These may be compared with the final incurred losses shown in Part 2, column 11, reported as the final row in Exhibit 10. The ultimate paid losses total $6,221 thousand, and the incurred losses shown on Part 2 total $6,244 thousand. The Part 3 prospective test shows adequate reserves.27

Schedule P loss reserve analyses sometimes assume that incurred loss estimates after 10 years of maturity are adequate, particularly if procedure 1 above is used. If reserves are adequate for cases 10 or more years old, there would be little adverse development for the “prior years” row in Part 2. If reserves are deficient even after 10 years of maturity, there would be significant adverse development for the “prior years” row.28

One must be wary, though, of simple extensions to reserve adequacy: adverse development on the Part 2 “prior years” row does not necessarily indicate that similar development should be expected in the future. In some lines of business, insurers have changed policy forms to mitigate late development or added policy exclusions to eliminate certain hazards. Examples are the switch from occurrence to claims-made policies in Medical Malpractice and the absolute pollution exclusion in Comprehensive General Liability pol-

26. Alternatively, one may estimate loss development tail factors by fitting statistical curves to the observed link ratios at earlier evaluations (see McClain, 1975; Sherman, 1985; Weller, 1989). In its analysis of industry-wide Schedule P reserve adequacy, ICI (1989) uses a “modified Boudy technique” similar to that described by Weller, Cholowsky, and Cohen (1991) and several methods, including Sherman’s procedure.

27. Schedule P data can also be used for various other types of paid loss development analyses. For a comprehensive treatment of an alternative method, which emphasizes average payment lags and a more sophisticated treatment of ultimate-link ratios, see Weller (1987).

28. To evaluate the adequacy of reserves for the “prior years” row, one may also examine the ratio of losses outstanding to losses paid in the current calendar year for the “prior line” accident year (that is, [Part 1, column 33, line 1] divided by [Part 1, column 11, line 1]). In each line of business, the expected ratio depends on the distribution of business among the old accident years. Carriers with higher ratios than the industry average may be better reserved. See Hicks (1991), Table 3, for a Workers’ Compensation example.
icies. In sum, loss development "tail factors" estimated from Schedule P data must be used with caution.

Considerations for Reserve Adequacy Testing

The Schedule P historical loss triangles are not always sufficiently homogeneous for accurate projections of reserve adequacy. Several illustrations are noted below, reflecting changes in the economic/insurance environment, state compensation systems, policy deductibles, policy exclusions, and company growth.

1. Economic/insurance Environment: During the past twenty years, workers' compensation medical costs increased more rapidly than indemnity losses, rising from 30 percent of benefits in the 1960s to nearly 50 percent in 1995. High medical care inflation, increasing use of physicians' services, and higher deductibles and coinsurance levels, along with more sophisticated cost containment efforts in group health insurance plans (which lead to cost-shifting to workers' compensation), all contribute to this. Medical benefits are paid quickly, whereas indemnity benefits are paid as the income loss accrues; the paid loss link ratios are therefore higher for indemnity benefits. The Schedule P, Part 3, loss reserve adequacy projection uses link ratios developed from experience dominated by indemnity losses and applies them to experience with a higher percentage of medical losses, thereby distorting the results (see Woll, 1981).

ability by type of injury and by the shift of claims from temporary disability to permanent partial disability (Gardner, 1989). These trends have abruptly stopped and perhaps even reversed in the 1990s, probably because of the system reforms enacted in many jurisdictions. It is unclear which effects are stronger: that is, whether a straightforward Part 3 analysis will over-estimate or under-estimate the required reserves.

2. **State Compensation Systems**: Several jurisdictions, such as Massachusetts, New Jersey, and Pennsylvania, have recently revised their Personal Automobile No-Fault Compensation systems by increasing Personal Injury Protection benefits, modifying the turt threshold, or providing policyholder options (Marter and Weisberg, 1991; Musek and Szczepanski, 1992). PIF and Residual Bodily Injury, although combined in Schedule P, have different paid loss development patterns, and a change in the mix of benefits may distort the estimates of reserve adequacy.

3. **Deductibles**: Many insurers have been raising General Liability deductibles, to avoid the expenses of “dollars trading” with policyholders and to reduce state premium taxes. Similarly, many workers’ compensation insurers are selling “large dollar deductible” policies in some jurisdictions to avoid involuntary market charges and premium taxes. Excess loss layers show higher paid loss development patterns than lower layers do, so the change in the mix of layers may distort the estimates of reserve adequacy (Pinto and Gogol, 1987).

4. **Policy Exclusions**: In 1986, ISO and many Commercial Lines insurers introduced an absolute pollution exclusion. Exclusion F of the pre-1986 Comprehensive General Liability policy, which excluded liabilities resulting from pollution except when it was “sudden and accidental,” has been termed ambiguous by several courts and interpreted to mean all unintentional pollution. Similarly, many insurers have been excluding coverage for asbestosis and other toxic torts from CGL policies.

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30. The Jackson Township case in New Jersey is a prominent example of this (Hamilton and Rotman, 1988; Wright, 1991). By 1991, most jurisdictions ruled that the CGL Exclusion F does indeed negate exposure for gradual pollution. See Manta and Welge (1990) for a good survey of legal opinion on Environmental Impairment Liabilities.
Because payments on old occurrences have been precipitated by recent judicial decisions, the data in Schedule P, Part 3H ("Other Liability") and Part 3R ("Products Liability"), show high paid loss line ratios for accident years in the early 1980's even at later valuations (that is, in the "prior years" row and in the 1985 accident year row). Much of this stems from asbestos and pollution payments that will not be repeated in the late 1980's or the 1990's (Cholinsky and Cohen, 1989, p.8). An accurate analysis of reserve adequacy must separate toxic torts and Environmental Impairment Liability from other Products Liability in Schedule P.

5. Company Growth: If an insurer expands its writings over the course of a year, more claims are incurred in the latter part of the year than in the earlier. Paid loss development factors are higher for accident years with later average loss occurrence dates. A change in the rate of business growth may distort the projection of reserve adequacy.31

In sum, Part 3 of Schedule P is the main publically available document for estimating reserve adequacy. However, one must be aware of the potential distortions caused by the lack of data homogeneity and shifts in mix of benefits to properly evaluate the statistical indications.

Closed Claim Counts

Columns 12 and 13 show the number of claims closed with and without loss payments. These claim counts are required for nine lines of business: Homeowners/Slabowners, Personal Auto Liability, Commercial Auto liability, Workers' Compensation, Commercial Multi-Peril, Medical Malpractice, Other Liability, Automobile Physical Damage, and Products Liability. No claim counts are required for other lines.

The column captions and the NAIC Instructions do not say whether the claim counts are net or "direct plus assumed." One might suppose that the claims counts should be net just as the losses are net. This is not correct. The claim counts are direct plus

31. Procedures to correct for these distortions are suggested by McClensahan [1987] and Beschist and Sherman [1977].
assumed (even though the losses are net), just as the claim counts in Part 1 and in Part 5 are direct plus assumed.

The ratio of column 11 to column 12 shows the average cost of a closed claim, as long as losses are not paid until the claim is settled.\textsuperscript{32} (For lines with partial paym ents on open claims, such as workers' compensation and Automobile No-Fault, the loss payment can not be matched with closed claims.) Among mature years, this ratio should increase as the accident years move forward, since average claim costs increase with inflation. Among immature years, this ratio may decrease as the accident years move forward, since small claims are settled more quickly than large claims are.\textsuperscript{33}

Part 2—Incurred Losses

Part 2 shows net incurred losses and allocated loss adjustment expenses ("ALAE") by accident year and evaluation date. The Part 2 entries are the sum of paid amounts, case reserves, and bulk reserves for both losses and ALAE. Each entry in Part 2 equals the corresponding entry in Part 3 plus the loss and ALAE reserves at that date.

Part 2 is designed as a retrospective test of loss reserve adequacy. If the insurer sets adequate reserves, the incurred losses for each accident year should show neither upward nor downward development. The NAIC uses Part 2 for the loss reserve development test in the Insurance Regulatory Information System ("IRIS").

IRIS Loss Development Tests

For any accident year, column 11 of Part 2 shows incurred losses valued at the Statement date, and column 10 shows the corresponding valuation one year earlier. If the insurer has reserved adequately, an increase in payments would be offset by a take down of reserves, and there should be no change in incurred losses between valuation.

\textsuperscript{32} As noted in the text, column 11 shows net losses per column 12 shows direct plus assumed claims reserves. In order to be consistent with column 13 of Part 3, one may substitute column 5 + 7 of Part 3 for column 11 of Part 3.

\textsuperscript{33} For carriers that do not keep records of "suspect" claims, or claims below a certain dollar value, settlement pattern of very small claims would not affect the Schedule P claim counts.
dates. Column 12 shows the latest year's change in incurred losses for all accident years except the most recent one [there is no "previous" valuation for the most recent accident year]. Column 13 shows the change over the last two years in incurred losses for all accident years except the most recent two.

These reserve developments are summed over all lines of business and shown in the Part 2 Summary Exhibit. The total reserve development shown on row 12 is compared with policyholders' surplus for IRIS Tests 9 and 10. IRIS test 11, a prospective test of reserve adequacy, updates the "outstanding" loss ratios from the past two years by means of the one- and two-year reserve developments, and compares these ratios with the current year's "outstanding" loss ratio.

IRIS Tests 9 and 10

IRIS Test 9 divides the one year reserve development by the policyholders' surplus at the end of the prior year, and IRIS test 10 divides the two year reserve development by the policyholders' surplus at the end of the second prior year. A ratio above 20 percent on either test is a "failing" score.

The "Five Year Historical Data" exhibit on page 23 of the Annual Statement, lines 62 through 65, show the one and two year developments and the ratios for tests 9 and 10 for the five most recent years.

IRIS Test 11

IRIS Test 11 evaluates the adequacy of the "outstanding" loss ratio. The outstanding loss ratio is the ratio of outstanding losses and loss adjustment expenses to the current year's earned premium. The losses and premiums in this ratio are not matched. The numerator is unpaid loss and loss adjustment expenses for all accident years, 34.

34. Ludwig and McAleer, 1986. p 227, using a Wilcoxon rank sum test on a sample of 84 reinsurance companies, find these tests to be good discriminators between strong and weak companies. Lucey (1991), however, in comparing a company's adverse loss development for accident years 1984-86 through calendar year 1985 with its development for accident years 1984-88 through calendar year 1989, finds little correlation between the development in the two periods. He concludes that past adverse loss development may not be a good predictor of current reserve adequacy.
whereas the denominator is earned premium for the current calendar year. This constraint obstructs the usefulness of IRIS Test 11, since business volume, growth or decline, or changes in the mix of business between property and liability lines, distort the “outstanding” loss ratio (Saltzmann, 1981, p. 175).

Unpaid losses and loss adjustment expenses are reported on page 3, “Liabilities, Surplus and Other Funds,” lines 1, 1A, and 2. Line 1 shows total loss reserves, including reinstatement payable on unpaid losses. Line 1A adds reinstatement payable on paid losses, and line 2 adds reserves for unpaid loss adjustment expenses (both allocated and unallocated). Earned premium is shown on page 4, “Underwriting and Investment Exhibit: Statement of Income,” line I.

IRIS test 11 adds the Schedule P, Part 2 Summary, reserve developments to determine updated outstanding loss ratios. The one year reserve development is added to the unpaid losses and loss adjustment expenses for the prior year. This sum is then divided by the prior year’s earned premium. The necessary figures are taken from the “previous year” column of the current Annual Statement, pages 3 and 4 (see the paragraph above). The two year reserve development is added to the unpaid losses and loss adjustment expenses for the second prior year, and this sum is divided by the second prior year’s earned premium. The necessary figures are taken from the “previous year” column in the previous year’s Annual Statement, pages 3 and 4.

The two updated outstanding loss ratios are averaged, and then multiplied by the current year’s earned premium (from page 4, column 1, line 1, of the current year’s Annual Statement) to derive the indicated outstanding losses and loss adjustment expenses. This figure, minus the reported unpaid losses and loss adjustment expenses (from page 3, column 1, lines 1 + 1A + 2), is the indicated reserve deficiency. A deficiency greater than 25 percent of policyholders’ surplus (page 5, line 25) indicates a failure of IRIS Test 11.

An illustration should clarify this procedure. Suppose that the 1995 Schedule P, Part 2 Summary, shows a one-year adverse loss development of $3 million and a two-year adverse loss development of $4 million. Let us use the data in the accompanying table from the current and the two previous Annual Statements to compute the results of IRIS test 11. (Figures are in thousands of dollars.)

The “outstanding” loss ratios for 1993 and 1994 are the “restated” loss reserves divided by the earned premium. The “restated” loss reserves are defined as:
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<th>'95</th>
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<tr>
<td>Earned premium, year ending 12/31/9_</td>
<td>12,000</td>
<td>12,500</td>
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<td>Loss reserves, 12/31/9_</td>
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<td>Reinsurance payable on paid losses, 12/31/9_</td>
<td>500</td>
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<td>Loss adjustment expense reserves, 12/31/9_</td>
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<td>Policyholders' surplus, 12/31/9_</td>
<td>15,350</td>
<td>17,400</td>
<td>24,250</td>
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loss reserves + LAT reserves + reinsurance payable on paid losses
+ adverse loss development.

For 1993, the restated loss reserves are:
$9 million + $0.5 million + $2.5 million + $4 million = $16 million,
and the restated outstanding loss ratio is
$16 million / $12 million = 133.3 percent.

For 1994, the restated loss reserves are:
$10 million + $1 million + $4 million + $3 million = $18 million,
and the restated outstanding loss ratio is
$18 million / $12.5 million = 144.0 percent.

The average restated outstanding loss ratio is |1.333 + 1.440| / 2 = 1.386. The 1995 earned premiums are $19 million, so the "required" outstanding losses are 1.386 x $19 million = $26,334,000.
The held reserves at December 31, 1995, are $20 million ($74 million + $1.5 million + $4.5 million). The reserve deficiency is $26,334 million - $20 million = $6,334 million. Since policyholders' surplus is $24,250,000, this is 26.1 percent of surplus, and the company "fails" IRIS test 11. The figures are shown in the table below.

This example illustrates the potential pitfalls in the IRIS test 11 results. The company grew rapidly in 1995, from $12.5 million of earned premium in 1994 to $19 million of earned premium in 1995. Loss reserves grew more slowly, from $15 million in 1994 (or $18 million after adverse loss development) to $20 million in 1995. The implication is that the company is not adequately funding reserves. But loss reserves relate to the business of both the current year and...
prior years, so reserve increases should lag premium increases in a growing company.

The NAIC realizes that changes in premium volume or mix of business may distort the results. Business growth overstates the reserve deficiency, though the NAIC believes the effect is not great: "Within the normal range of variations in premium from year to year, the distortion from changes in premium is not significant" (NAIC IRS Manual, 1989, p 27). A change in product mix from property to liability lines will understate the reserve deficiency, so the NAIC recommends that "For companies which have had major shifts in product mix, the estimated reserve deficiency or redundancy should be calculated separately for the major product groups..." (Ibid.). A decline in business volume, and a shift in product mix from liability to property lines, have the opposite effects from those mentioned above.

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<table>
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<tr>
<th>TABLE 12</th>
<th>IRIS Test 11: Estimated Reserve Deficiency (Figures in Thousands of Dollars)</th>
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<tbody>
<tr>
<td>1. Loss reserves (page 3, line 1)</td>
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<td>2. Reins. Payable on Paid Losses (p. 3, 1A)</td>
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<td>3. Loss Adj. Expense Reserves (page 3, 1, 2)</td>
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<td>4. Adverse Loss Development (Sch P)</td>
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<tr>
<td>5. Restated Loss Reserves (1 + 2 + 3 + 4)</td>
<td>16,000</td>
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<td>6. Earned Premium (page 4, line 1)</td>
<td>12,000</td>
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<td>7. Outstanding Loss Ratio 5/6</td>
<td>1.333</td>
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<td>8. Earned Premium (page 4, line 1)</td>
<td>19,000</td>
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<td>9. &quot;Required&quot; Outstanding Losses (× 0)</td>
<td>26,334</td>
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<tr>
<td>10. Held Reserves at 12/31/1995 (1 + 2 + 3)</td>
<td>20,000</td>
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25. As an extreme example, consider a company which has only two lines of business: a discounted line of environmental impairment liability (EIL) and a continuing line of homeowners insurance. All reserves stem from the EIL writings, and all premium stems from the homeowners writings. Increases in the homeowners business volume have no influence on the amount of reserves needed.

36. IRIS test 11 allows a "cushion" equal to 25 percent of "policyholders' surplus. In most cases, this cushion is large enough to outweigh the effects of premium growth or change in mix of business.
Case Incurred Losses

Part 2 includes bulk reserves, in addition to case reserves and paid losses. Actuaries project indicated reserves from historical experience, such as loss payments and reserves set by claims examinees, not from previous actuarial forecasts. Part 4 of Schedule P shows the bulk reserves carried by the company in past years in the same format as in Part 2. Thus, the difference between Parts 2 and 4 reflects the historical claims experience of the company. The case incurred (or reported) loss development patterns derived from this experience can be used to prospectively estimate reserve adequacy.67

Once again, we illustrate the analysis with simulated figures as they would appear in Parts 2 and 4 of the 1995 Schedule P.

For a well reserved company, Part 2 should show little upward or downward development along the rows. This illustration shows no significant development for accident years 1988, 1989, 1991, 1993, and 1994; slight downward development for accident years 1986 and 1987; and slight upward development for accident years 1990 and 1992. For all accident years combined, there is an 0.5 percent decline in incurred losses from the first report to the statement date.

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67. Good introductory treatments of incurred loss development reserving procedures are Salzmann, 1984, pp. 31-34; Wiser, 1990, pp. 187-189; and Petley, 1981, pp. 196-224. I am indebted to Roy Moorill, who first pointed out to me this use of Parts 1 and 4 for a prospective test of reserve adequacy.
Part 4 shows bulk and IBNR reserves. Since bulk reserves are replaced by case reserves and payments as claims are reported and settled, we expect a steady decline along the rows.

The difference between Parts 2 and 4 shows case incurred (or reported) losses plus ALAE, and may be used for prospective loss reserve adequacy tests.

**Link Ratios and Development Factors**

Incurred loss link ratios shown below are formed in the same manner as paid loss link ratios.

**TABLE 14**

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**TABLE 15**

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<td>477</td>
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<td>608</td>
<td>645</td>
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<td>1992</td>
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<td>1995</td>
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<td></td>
<td></td>
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</table>
Loss reserve projections that rely on case incurred loss development patterns are aided by knowledge of the insurer's case reserving practices, as well as of changes in these practices during the experience period. The three year average incurred loss link ratios are higher than the corresponding five year averages for the first three maturities, so we have selected the three year averages as estimates for the future.

For all accident years combined, the estimated ultimate incurred loss plus ALAE is $5,188 thousand, and the reported incurred amounts on Part 2 are $6,244 thousand. The difference of less than 1 percent indicates accurate reserving.

### TABLE 16

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1 to 2</th>
<th>2 to 3</th>
<th>3 to 4</th>
<th>4 to 5</th>
<th>5 to 6</th>
<th>6 to 7</th>
<th>7 to 8</th>
<th>8 to 9</th>
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<td>1.05</td>
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### TABLE 17

Case Incurred Loss Development Test of Reserve Adequacy

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1 to 2</th>
<th>2 to 3</th>
<th>3 to 4 to 5</th>
<th>5 to 6</th>
<th>6 to 7</th>
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<td>Averages</td>
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<tr>
<td>3 yr</td>
<td>1.68</td>
<td>1.17</td>
<td>1.08</td>
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<td>1.03</td>
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</tr>
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<td>5 yr</td>
<td>1.72</td>
<td>1.18</td>
<td>1.09</td>
<td>1.05</td>
<td>1.03</td>
<td>1.02</td>
<td>1.02</td>
<td>1.01</td>
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<td>1.09</td>
<td>1.05</td>
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<td>1.02</td>
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<tr>
<td>Cumulative</td>
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<td>1.15</td>
<td>1.09</td>
<td>1.06</td>
<td>1.04</td>
<td>1.02</td>
</tr>
<tr>
<td>Case Incurred</td>
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<td>656</td>
<td>670</td>
<td>665</td>
<td>690</td>
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<td>LTL Incurred</td>
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<td>769</td>
<td>705</td>
<td>646</td>
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<td>453</td>
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<tr>
<td>Tot. Reported</td>
<td>898</td>
<td>866</td>
<td>802</td>
<td>787</td>
<td>707</td>
<td>667</td>
<td>522</td>
<td>475</td>
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</tbody>
</table>
Updating the Part 2 Exhibits

The figures for individual accident years in Part 2, except for those in the right-most column and the "prior years" row, may be copied from the corresponding entries in the previous Annual Statement. The entries for the right-most column can be copied from Part 1. For each accident year, Part 2, column 11, equals columns 11 - 10 + 23 - 22; from Part 1. Columns 11 and 23 so Part 1 show total paid and unpaid losses plus loss adjustment expense. Since Part 2 does not include unallocated loss adjustment expense, one must subtract columns 10 and 22 from Part 1.

For the "prior years" row, a slight modification is required. The entries in the previous year's Schedule P for the "prior" row and for the first accident year should be divided between reserves and paid losses: paid losses are in Part 3 and reserves equal Part 2 minus Part 3. The reserves from the first two rows in the previous year's Schedule P are added together and posted directly to the current Schedule P. The current Schedule P payments can be taken from Part 3. The sum of the reserves and the payments is the current year's "prior years" row on Part 2.

Insured loss development reserve procedures are particularly important for long-tailed lines of business whose loss payments are small at early maturities, such as Products Liability and Excess of Loss Reinsurance.

Part 4—Bulk Reserves

Part 4 shows bulk, or "actuarial," reserves, by accident year and evaluation date. These are reserves "for incurred but not reported claims, for reopened claims, for development on case reserves of reported claims, and for aggregate reserves on newly reported claims without specific case reserves" [1995 NAIC Instructions, p 218]. The use of Part 4 to derive case incurred (or reported) loss figures is described above.

Part 5—Claim Counts

Parts 2, 3, and 4 of Schedule P allow the analyst to perform prospective reserve analyses using absolute dollar techniques, using either
paid loss methods [Part 3] or incurred loss methods [Parts 2 and 4]. In addition to the “chain ladder” development methods described above, one can use the Schedule P data for “expected loss,” or “Ben- huettner-Ferguson,” reserve analyses, on either a paid loss or incurred loss basis.  

Each absolute dollar reserving method has a corresponding “claim count and average severity” method.  Part S shows the requisite claim count triangles for each line of business:

- Cumulative direct plus assumed claims closed with loss payment.
- Direct plus assumed claims outstanding, and
- Cumulative direct plus assumed claims reported.

A triangle of direct plus assumed claims closed without loss payment can be derived from the three triangles shown, since:

reported claims = claims outstanding + claims closed with loss payment + claims closed without loss payment.

Similarly, the number of claims closed with or without loss payment is simply the number of reported claims minus the number of claims outstanding.

Absolute dollar reserve analyses may be hampered by changes in the volume of business. Claim count development, however, is often stable, and average severity estimates can be compared with inflation indices. For instance, required reserves for the most recent accident year are difficult to measure in long-tailed lines of business. But if the ultimate claim count can be estimated, and average severities are assumed to be, say, 8 percent higher than those in the previous accident year, then the required reserves can be estimated.

Part S serves as an effective regulatory monitoring tool as well. Distressed insurers may artificially strengthen their surplus and

38. For a description of the “expected loss” reserving technique, see Benhuetner and Ferguson (1972). Ideally, the expected loss method requires an a priori expected loss ratio, such as the expected loss ratio used for pricing the business, which is not available from the Schedule P data.

39. For a discussion of outstanding claim counts and average values, and their use in loss reserve estimates, see Peterson, 1981, chapters 8 and 9.
Actuarial Reserving and Financial Regulation

avoid regulatory scrutiny by: (a) weakening case reserves, (b) not putting up the needed bulk reserves, and (c) paying claims more slowly. Whereas analyses of reserve adequacy based on absolute dollar figures may not uncover the problems, the claim count triangles would show two results:

- Reported claim counts are not affected by reserve strengthening or weakening. Rather, the lower case and bulk reserves will depress the average severities, revealing the potential reserve problem.

- The slower claim settlement patterns are reflected by lower paid-to-reported claim ratios and higher open-to-reported claim ratios.

Adjusting the Historical Triangles

Actuaries have developed techniques to correct for distortions caused by case reserve strengthening or weakening and for changes in claim settlement patterns [see Berquist and Sherman, 1977]:

- The paid loss development analysis discussed above uses "chronological" development ages: 12 months, 24 months, and so forth. When loss settlement patterns are changing, the analyst may use "settlement" ages. That is, instead of using cumulative paid losses through 12 months, 24 months, and so on, the analyst may use cumulative paid losses through the period of time when 25 percent of claims have been settled, 35 percent of claims have been settled, and so forth. This type of analysis requires paid claims count histories, which can be derived from the triangles in Part 5.

- The incurred (i.e., reported) loss development discussed above is disected by changes in case reserve adequacy, even when these changes are compensated for by offsetting changes in bulk reserve levels. To circumvent the problems caused by varying case reserve adequacy levels, one may "detrend" the current average severities for the presumed rate of loss cost inflation. For instance, if the average severity of personal automobile liability open claims is $20,000, and if the presumed loss cost trend for the preceding year is 8 percent, then the expected average severity in the previous year should have
been about $18,500. If the average value of open claims in the previous year differs significantly, and if this difference is consistent across various development ages, then the case reserve adequacy may have changed. Replacing the observed value with the $18,500 expected value corrects for the distortions caused by changing reserve adequacy levels.

**Net vs. Direct Plus Assumed**

The claim count triangles in Part 5 show direct plus assumed business. The loss triangles in Parts 2, 3, and 4 show net business. If the company has a significant amount of ceded business, and if the percentage ceded of proportional treaties or the retentions in non-proportional treaties have changed over time, then the average severity analyses will be distorted.

So why do the claim count triangles in Part 5 show direct and assumed business instead of net business? The reason is twofold.

- It is difficult to measure net claim counts for business with ceded non-proportional reinsurance. For instance, suppose that a property is insured for $10 million, with an excess-of-loss reinsurance cover of $8 million above a $2 million retention. Suppose also that a claim is incurred which exceeds the retention. Clearly, there is one direct claim for the primary company, and one assumed claim for the reinsurer. But is there 1 net claim, 0 net claims, or some intermediate number for the primary company?

- Before 1994 the only claim counts shown in Schedule P were for the current valuation. [These are the Part 1 and Part 3 claim count columns.] The intention was to match the direct plus assumed claim counts with the direct plus assumed loss statistics. The difficulties in matching net vs. direct plus incurred business arose only with the addition of historical claim count triangles to Schedule P in 1993.

**Average Values of Outstanding Claims**

Both Part 1, column 24, “Number of Claims Outstanding,” and Part 5, Section 2, allow one to determine the average value of an outstanding claim. Net case reserves by accident year equal Parts 2 —
3 - 4, which gives a complete triangle. Direct plus assumed case reserves by accident year equal Part 1, columns 13 + 17, which shows only the figures for the current statement date. The case reserves divided by the number of claims outstanding is the average value of an open case. A comparison of these values by accident year shows trends in average loss costs.

There are several pitfalls that the analyst must avoid.

1. Smaller claims are generally settled more rapidly than larger, more complex, claims. Thus, the average value of the remaining outstanding claims increases as development age increases. This is distinct from the inflationary increase in claim costs that appears as accident years move forward.

The analysis of trends in average claim costs from accident year to accident year requires a comparison of the diagonals of Parts 2 - 3 - 4 divided by the diagonals in Part 5, Section 2. This uses net losses divided by direct plus assumed claim counts, so it is distorted by changes in reinsurance arrangements. Any "trend" evident in the division of Part 1, columns 13 + 17, by Part 1, column 54, results from a mixture of the claim costs changes from year to year and the changes in the average value of cases remaining open as the development age increases. The latter changes generally outweigh the former changes, rendering the "trend" analysis meaningless.

2. For lines of business with substantial partial payments on open claims, the average values are depressed. For the true average value of open cases, one wants case reserves plus payments on open claims divided by the number of open cases. In Workers' Compensation, indemnity benefits are paid weekly as the ultimate loss accrues, so the distortion in average value is greater in older accident years and smaller in more recent accident years. Thus, if one uses the Part 1 loss figures to get average values on a direct plus assumed basis to measure trends, there is an additional distortion in lines with partial payments.

Completing the Part 5 Exhibits

Part 5 has three sections: Section 1 shows cumulative claims closed with loss payment, section 2 shows claims outstanding, and section 3 shows cumulative reported claims.
Section 1 of Part 5 is similar to Part 3 (cumulative loss payments), the one difference relates to the "prior years" row. In Part 3, the individual accident years show cumulative figures, and the "prior years" row shows cumulative loss payment beginning with the second calendar year shown along the top of the exhibit. For instance, in the 1995 Annual Statement, the "prior years" row in Part 3 shows cumulative loss payments beginning from January 1, 1987, for accident years 1985 and prior.

Similarly, column 12 of Part 3 of the 1995 Annual Statement, "number of claims closed with loss payment," shows the cumulative number of claims through the statement date for the individual accident years. In the "prior years" row in the 1995 Annual Statement, column 12 shows the cumulative number of claims closed with loss payment from January 1, 1987, through December 31, 1995, for accident years 1985 and prior.

Section 1 of Part 5 shows the cumulative number of claims closed with loss payment for the individual accident years at each December 31. Thus, for the individual accident years, column 11 of Part 5, Section 1, equals column 12 of Part 3. For the "prior years" row, section 1 of Part 5 shows incremental closings in each calendar year, not the cumulative total. For the "prior years" row, column 11 of section 1 of Part 5 does not equal column 12 of Part 3.

A simplified example should clarify these reporting procedures.

Suppose that for accident year 1986, a company has 5,000 claims closed with payment in each calendar year from 1986 through 1995. For accident years 1985 and prior, the company has 10,000 claims closed with payment in each calendar year from 1985 through 1995.

For accident year 1986 in Part 5, Section 1, the counts are cumulative, so the company reports 5,000 in the 1986 column (column 2), 10,000 in the 1987 column (column 3), 15,000 in the 1988 column.

---

40. One might ask: "Neither the NAIC instructions nor the Schedule P exhibit make any mention of this difference. How might one infer it from the statutory statement?"

The upper left-hand cell of the Part 3 exhibits contains "000," indicating that the cumulative payments begin in the second column. In theory, these are the payments from the reserves held at the year-end date corresponding to the first column. The "prior years" closed claims shown in columns 12 and 13 of Part 3 correspond to the cumulative paid losses at the current statement date in column 11. In section 1 of Part 5, the first cell in the "prior years" row does not contain "000," indicating that this row shows incremental closed claims, not cumulative closed claims. (I am indebted to Richard Roch for explaining this to me.)
(column 4), and so forth, ending with 50,000 in the 1995 column (column 11). For the "prior years" row, the counts are incremental, so the company reports 10,000 claims in each column. In column 12 of the Part 3 exhibit, for accident year 1986, the company shows the cumulative count at the current statement date, or 50,000, as in Part 5, Section 1, column 11. For the "prior years" row, column 12 shows the cumulative claims closed since January 1, 1987, or 50,000, which differs from the entry in Part 5, Section 1, column 11 (which is 10,000).

Part 5, Section 2, shows claims outstanding at each year end. This figure is affected by the company's small claims handling procedures: some companies do not set up claim files for small claims that are expected to be settled quickly, as often occurs in personal automobile physical damage.

Part 5, Section 3, is similar to Part 5, Section 1. The individual accident years show the cumulative claims reported, whereas the "prior years" row shows the incremental claims reported in each calendar year interval. The relationship that:

\[
\text{cumulative reported claims} = \text{cumulative paid claims plus outstanding claims}
\]

holds for the individual accident years, not for the "prior years" row.\footnote{In the 1995 Annual Statement, the "prior years" row in Part 5, Section 3, is "XXX"ed out. In the 1996 Annual Statement, the "XXX"s are removed. The discussion in the text refers to the 1996 and subsequent Annual Statements.}

Consider how the Part 5, Section 3, exhibits will look (in 1996 and subsequent years) for a claims-made line of business. For claims-made coverage, the Schedule P "incurred date" is the report date. For the individual accident years, the figures in the initial diagonal should be carried unchanged along each row. The entries in the "prior years" row should all be zero.

Part 6—Premium Development

Part 6 shows the development of exposure year earned premium, similar to the development of incurred losses in Part 2. Exposure year earned premium is not required elsewhere in the Annual State-
ment, and many companies do not have the requisite historical data. Therefore, only exposure years 1993 and subsequent need be reported in Schedule P, though companies may report entries for other years if they have the data.

In the 1996 and subsequent Schedules Pn, the distribution of the current calendar year’s earned premium to all exposure years must be shown, along with a reconciliation of the earned premium figures to those in Part 1 of Schedule P. Furthermore, the reporting in the “prior years” row has been clarified by the deletion of the “000” entry in the top-left cell of the exhibit. Thus, the discussion here relates to the 1996 Part 6.

Exposure year premium figures are important for lines of business where premiums are affected by exposure audits, retrospective rating adjustments, or accounting lags in booking premiums. Consider a retroactively rated workers’ compensation policy issued on January 1, with a premium rate of $1 per $100 of payroll. On January 1, the insured employer may estimate $2,000,000 of payroll for the coming year, so the initial written premium is $20,000. After the policy term has expired, the insurer may audit the employer’s payroll records. If the true payroll was $2,500,000, the insurer will bill the employer for an additional $5,000 of premium. Furthermore, as retrospective rating adjustments are made for this policy in subsequent years, the insurer will return premium to the employer or bill the employer for additional premiums.

Calendar Year, Exposure/Accident Year, and Policy Year

Earned premium may be calendar year, exposure year, or policy year, and incurred losses may be calendar year, accident year, or policy year. The Annual Statement reporting procedures are as follows:

1. For earned premium:
   - The Underwriting and Investment Exhibit, Part 2, the Income Statement, and Schedule P, Part 1, show calendar year earned premium.
   - Schedule P, Part 6, shows exposure year earned premium. The reconciliation of Schedule P, Part 6, to Schedule P.
Part 1, is shown in the last line of Part 6 (1996 and subsequent Annual Statements).

- Schedule P, Part 7, shows policy year earned premium for loss-sensitive contracts only.

2. For incurred losses:

- The Underwriting and Investment Exhibit, Part 3, and the Income Statement show calendar year incurred losses.
- Schedule P, Parts 1 and 2, show accident year incurred losses. The reconciliation of accident year incurred losses to calendar year incurred losses is not shown explicitly, but it can be derived in the same manner as for earned premiums. 42
- Schedule P, Part 7, shows policy year incurred losses for loss-sensitive contracts.

An example should clarify the reporting of calendar year, exposure/accident year, and policy year figures for retrospectively rated policies or for policies with premium audits. Suppose a retrospectively rated annual workers' compensation policy is issued on April 1, 1993, for a $10,000 premium. One loss occurs on March 1, 1994, with an initial reserve estimate of $5,000. On July 1, 1994, the payroll audit indicates that an additional $1,000 of premium should be collected. On January 1, 1995, the case reserve is revised to $25,000. On February 1, 1995, the first retrospective adjustment calls for an additional premium of $4,000.

This is a loss-sensitive contract, so its premium and loss amounts appear in all parts of Schedule P, as well as in the rest of the Annual Statement. The appropriate earned premium and incurred loss figures are as follows:

42 The reconciliation is complicated by the differing treatments of loss adjustment expenses. In the historical examples of Schedule P, Parts 1, 2, and 4, allocated loss adjustment expenses are combined with losses, and unallocated loss adjustment expenses are not shown. In the Underwriting and Investment Exhibit, loss adjustment expenses are shown only in total (i.e., allocated + unallocated), separate from losses. In Schedule P, unallocated loss adjustment expenses are shown in Part 1, which also shows the split between losses and allowed loss adjustment expenses. Since Part 1 of Schedule P shows only the current valuation, the current and previous Annual Statements are needed for the reconciliation of accident year incurred losses to calendar year incurred losses.
1. Calendar year incurred losses [Underwriting and Investment Exhibit, Income Statement, Schedule P, Part 1] equal paid losses plus the change in reserve:
   • The 1993 incurred losses are zero.
   • The 1994 incurred losses are $5,000.
   • The 1995 incurred losses are $20,000 [ = $25,000 – $5,000].

2. Calendar year earned premiums [Underwriting and Investment Exhibit, Income Statement, Schedule P, Part 1] equals written premium minus the change in the unearned premium reserves:
   • The initial premium is split $7,500 for calendar year 1993 and $2,500 for calendar year 1994, reflecting the pro-rata earning of premium over the coverage period.
   • The audit premium of $1,000 is recorded as 1994 earned premium.
   • The retrospective premium of $4,000 is recorded as 1995 earned premium.

This accounting presumes that the premiums resulting from the exposure audit and the retrospective adjustment are unanticipated, and that the increase in losses is not anticipated in the IBNR reserve. If reserves are held for future “earned but not reported” [EBNR] premiums, the accounting is different (see below).

3. Policy year incurred losses [Schedule P, Part 7]:
   • At December 31, 1993, policy year 1993 incurred losses are zero.
   • At December 31, 1994, policy year 1993 incurred losses are $5,000.
   • At December 31, 1995, policy year 1993 incurred losses are $25,000.

4. Policy year earned premium [Schedule P, Part 7]:
   • At December 31, 1993, the (estimated ultimate) 1993 earned premiums are $10,000.
   • At December 31, 1994, the revised 1993 earned premiums are $11,000; 1994 earned premiums (from this policy) are zero.
5. Accident year incurred losses (Schedule P, Parts 1 and 2):
   • At December 31, 1993, accident year 1993 incurred losses are zero.
   • At December 31, 1994, accident year 1993 incurred losses are zero, and accident year 1994 incurred losses are $5,000. [The loss occurred on March 1, 1994.]
   • At December 31, 1995, accident year 1993 incurred losses are zero, accident year 1994 incurred losses are $25,000, and accident year 1995 incurred losses (from this policy) are zero.

6. Exposure year earned premiums (Schedule P, Part 6):
   • At December 31, 1993, exposure year 1993 earned premiums are $7,700.
   • At March 31, 1994, exposure year 1992 earned premiums are $7,500 and exposure year 1994 earned premiums are $2,500. The July 1, 1994, audit is distributed over the policy term, so on December 31, 1994, the exposure year 1993 earned premiums are $8,250, and the exposure year 1994 earned premiums are $2,750.
   • How should the $4,000 retrospective premium be divided between exposure years 1993 and 1994? In theory, the $4,000 retrospective premium stems from a February 1994 loss, so it should be recorded as an exposure year 1994 earned premium. In practice, it is far too complex to allocate retrospective premiums to exposure years based on the accidents which led to the premiums. Thus, the retrospective premiums are allocated to exposure years as the audis premiums are allocated, in proportion to the coverage period: $3,000 to exposure year 1993 and $1,000 to exposure year 1994.

43. The 1995 NAIC Instructions, page 220, say "Premium adjustments for policy periods that cover more than one calendar year should be proportionately distributed between the calendar years covered by the policy period."
44. In practice, companies will differ in their reporting practices. Most companies do not now have databases of "exposure year" earned premiums, and they lack the computer facilities to easily obtain this information.
Accounting for Exposure Year Premiums

Part 6 shows premium development triangles separately for direct plus assumed (Section 1) and for ceded business (Section 2). Net premium development is the difference between these two triangles. Direct plus assumed business is shown separately from ceded business since premium development patterns often differ between primary policies and reinsurance treaties.

The exhibits and instructions for the 1995 Part 6 are confusing; they are expanded and clarified for the 1996 and subsequent Annual Statements. The following paragraphs relate to the 1996 Annual Statement. The accounting rules are as follows:

1. The individual exposure years show cumulative earned premiums.

2. The “prior years” row shows incremental calendar year changes to the prior exposure years' earned premium. The Part 6 exhibits are like the Part 5 exhibits in this respect, not like the Part 3 exhibits. Accordingly, the “000” in the upper left-hand cell of the 1995 Part 6 exhibits has been removed in 1996.

   In other words, if there is an unanticipated retrospective adjustment made in 1996 to a 1987 exposure year earned premium, the cumulative total premium is shown on row 2, column 11. If there is an unanticipated retrospective adjustment made in 1996 to a 1986 exposure year earned premium, the calendar year 1996 adjustment, not the cumulative total premium, is shown on row 1, column 11.

3. For all but the current calendar year, earned premiums need be distributed only to exposure years 1993 and subsequent. [The full distribution to all exposure years may be shown if the company desires and has the data.] Earned premiums distributable to earlier exposure years need not be shown, so a reconciliation to calendar year earned premiums is not possible for calendar years prior to the current accounting year.

4. The distribution of the current calendar year's earned premiums to all exposure years (including the “prior years” row) must be shown in column 12 of Part 6, to facilitate the reconciliation with calendar year earned premiums. [This col-
unn does not appear in the 1995 Schedule P. All the entries in this column are incremental figures, not cumulative figures. For the other columns, the individual exposure year entries are cumulative, and the "prior years" entry is incremental.

5. The final row of the Part 6 exhibits shows the Schedule P, Part 1, calendar year earned premiums. [This row does not appear in the 1995 Part 6.]

Accrued Retrospective Premium Reserves

The illustration above assumes that the company has no "reserve for rate credits or retrospective adjustments based on experience" for this policy. In practice, companies will indeed accrue such reserves, which changes the accounting treatment. For simplicity, we term such reserves "earned but not reported" (EBNR) premium reserves, similar to "incurred but not reported" (IBNR) loss reserves.45

The statutory accounting principles are as follows:

1. In the Underwriting and Investment Exhibit, Part 2A, the "reserve for rate credits or retrospective adjustments based on experience" is an offset to the earned premium reserve. These adjusted unearned premium reserves are used to calculate the earned premiums in Part 2 of the Underwriting and Investment Exhibit. The total earned premiums for all lines of business combined is carried to line 1 of the Statement of Income [page 4].

2. The "accrued retrospective premium based on experience" for all lines of business combined is removed from the earned premium reserve on line 33 of Part 2A of the Underwriting and Investment Exhibit, and the net amount is shown on line

45. The Annual Statement uses the terms "reserve for rate credits or retrospective adjustments based on experience" [Underwriting and Investment Exhibit, Part 2A, column 4] and "accrued retrospective premiums" (balance sheet, page 2, line 9.3). Exhibits 1, line 9.3, and Underwriting and Investment Exhibit, Part 2A, line 33. There is presently some confusion regarding the relationship of these two Annual Statement terms, as well as of the admissibility of EBNR premiums relating to exposure audits (instead of retrospective adjustments). Since these questions are not specific to Schedule P, they are not dealt with in this paper.
34. Since the "accrued retrospective premium" is a contra-liability, though it is shown as a positive figure in the Annual Statement, line 34 equals line 32 plus line 33. [In contrast, the "reserves for rate credits or retrospective adjustments based on experience" shown in column 4 of Part 2A are shown as negative figures when they are contra-liabilities.]

3. The line 34 unearned premium reserve is carried to page 3, line 9, of the balance sheet: "unearned premium reserves." The accrued retrospective premiums on line 33 of Part 2A are carried to column 2, line 9.3, of Exhibit 1 [page 13]; the non-admitted portion is deducted in column 3, and the net admitted portion is shown in column 4. This final figure is carried to line 9.3 of the balance sheet (page 2). 46

A simplified illustration should clarify the recording of premium in Parts 6 and 7 of Schedule P. 46 Suppose the company issues a retrospectively rated workers' compensation policy with a deposit premium of $100,000 on January 1, 1994 [so the exposure year is the same as the policy year]. Several large losses occur in 1994, and on December 31, 1994, the company expects to collect an additional $40,000 in future retrospective adjustments, so it puts up an EBNR asset (or contra-liability) of $40,000.

The company can collect additional premium only for reported losses, not for IBNR losses or for expected development on known claims. At the first retrospective adjustment on July 1, 1995, the company collects $30,000 from the insured employer and reduces the EBNR reserve to $10,000.

During the third quarter of 1995, there is unexpectedly high development on the reported claims. By December 31, 1995, the company raises the EBNR reserve to $20,000.

The reporting in Parts 6 and 7 of Schedule P is as follows:

46. For most other items, the incurred amount on the income statement equals the paid or received amount on the cash flow statement plus the change in reserves on the balance sheet. For premiums, this relationship does not hold, since there are different treatments of accrued retrospective premiums in the income statement and on the balance sheet.

47. The treatment of these items in Exhibit 1 and on the balance sheet has additional complexities (namely, the non-admissibility of a portion of the unsecurized accrued retrospective premiums) that are not touched on in this paper.
1. The 1994 exposure year earned premium in Part 6, as well as the 1994 policy year earned premium in Part 7, Section 4, is the written premium minus the change in the unearned premium reserve. The EBNR reserve is a contra-liability, which went from $60 on January 1 to $40,000 on December 31. The 1994 earned premium is:

\[ \$100,000 - (-40,000) - 0 = 140,000. \]

2. The “net reserve for premium adjustments and accrued retrospective premiums at year end” in Section 5 of Schedule P, Part 7, shows the contra-liabilities as positive figures. The figure for policy year 1994 is $40,000 at December 31, 1994.

3. In calendar year 1995, Parts 6 and 7 of Schedule P show cumulative figures. The cumulative 1994 earned premium is the $130,000 paid plus the $30,000 remaining reserve, or $150,000.

An alternative view is helpful for the reconciliation with calendar year earned premium. The 1995 calendar year earned premium in the written premium minus the change in reserves, or:

\[ 30,000 - (-20,000) - (-40,000) = 10,000. \]

This $10,000 is added to the $140,000 exposure year 1994 earned premium at December 31, 1994, to give a cumulative amount of $150,000 at December 31, 1995.

4. The “net reserve for premium adjustments and accrued retrospective premiums at year end” in Section 5 of Schedule P, Part 7, for policy year 1994 at December 31, 1994, is $20,000.

Completing the Part 6 Exhibits

An illustration should help clarify the reporting of premiums in Part 6 and the reconciliation with Part 1. Since the earned premium entries include the EBNR reserves, a company which sets reserves accurately should show little development along the row. Upward development indicates conservatism; downward development indicates over-optimistic reserves.
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Table 18 shows a sample Part 6 exhibit for a company which distributes its earned premium to all exposure years, even those preceding 1992. The final row in the exhibit shows the calendar year earned premiums from Schedule P, Part 1, column 2 [direct plus assumed earned premiums]. Consider calendar year 199.. Of the $630,000 in earned premium, $620,000 is allocated to exposure year 1991. $5,000 is allocated to exposure year 1990, which is the difference between the cumulative figures of $580,000 and $555,000. A negative $5,000 is allocated to exposure year 1988; in other words, the take down in the EBNX for exposure year 1988 between 12/31/90 and 12/31/91 exceeded the additional premiums collected in this period for exposure year 1988. For the prior years row, the Part 6 entries are the incremental values themselves. The reconciliation is as follows: the calendar year "X" earned premium =

48. Table 18 shows both upward and downward development in various cells. The example in the 1996 NAIC Instructions shows only upward development, as though implying that a company may book reserves for expected premium returns but may not book contra-liabilities for expected additional premium collections.
the sum of the calendar year "X" column entries for individual exposure years
- the sum of the calendar year "(X-1)" column entries for individual exposure years
+ the calendar year "X" entry for the "prior years" row.

This reconciliation is possible only if the company shows entries for all exposure years. If entries are shown only for exposure years 1993 and subsequent, then any changes in earned premium associated with previous exposure years simply disappear. The right-most column in the exhibit shows incremental premium changes for all exposure years during the current calendar year, to enable a reconciliation with the current calendar year earned premium.

**Approximations**

Part 6 is similar to Part 2; both show development of incurred amounts. In Part 2, however, payments and case reserves are related to particular losses, which are associated with specific accident years. Similarly, bulk reserves are generally determined by the development of accident year paid losses or reported losses, so bulk reserves also relate to specific accident years.

Return premium and additional premiums are associated with policies, and EBNR reserves are generally determined from policy year triangles, not exposure year triangles. Most companies will convert the return premiums, additional premium collections, and EBNR reserve changes from a policy year basis to an exposure year basis by approximations. Nevertheless, since the primary purpose of Part 6 is to allow the computation of accurate exposure/accident year loss ratios, Part 6 uses exposure years, not policy years.

**Part 7—Loss Sensitive Contracts**

The NAIC Instructions say [1995, p 221]: "Schedule P, Part 7, is only required of companies who claim a reduction in their Risk-Based Capital for Loss Sensitive Contracts." Part 7 was designed by the American Academy of Actuaries Task Force on Risk-Based Capital, and it has two purposes:

- To determine the company's percentage of written premium, and of reserves related to loss-sensitive contracts, and
• To determine the sensitivity of premium and of reinsurance commissions on loss-sensitive contracts.

The risk-based capital reserving risk and written premium risk charges say: “How much additional capital should an insurer hold to guard against worse than expected development of loss reserves or worse than expected future underwriting results?” For instance, the formula might say: “The worst adverse loss reserve development for workers’ compensation experienced by the industry over the past ten years, after adjustment for investment income, was 10 percent of reserves held. Therefore, companies should hold capital equal to 19 percent of their reserves to guard against future adverse loss development of similar magnitude.”

In other words, the risk-based capital formula might say: a company with $100 million of workers’ compensation loss reserves might face unanticipated adverse loss development of $25 million. It will earn about $15 million of investment income on the reserves, so it needs $10 million in additional capital to guard against this reserving risk.

Companies which wrote retroactively rated workers’ compensation policies argued that if losses developed adversely, they would receive additional premiums, offsetting the need for additional capital. Industry data to quantify the responsiveness of premiums to losses were lacking; that is, for each additional dollar of loss, how much more premium should be expected? For the initial risk-based capital formula, the NAIC chose conservative “offset” figures. Part 7 is designed to provide the data for more accurate estimates.

Loss sensitive contracts are of three types:

• In retrospectively rated primary policies, the final premium depends on the losses incurred by the insured, subject to loss limits and premium maximums and minimums.

• In sliding scale commission reinsurance treaties, the reinsurance commission depends on the loss ratio experienced on the assumed book of business, subject to a maximum and minimum.

49. The actual formula is more complex, see Sholem Feldblum, “Risk-Based Capital Requirements,” for a complete description.
• In many policyholder-dividend plans, the dividend payable to each insured depends on that insured's loss ratio or on the loss ratio of a classification group.

The risk-based capital principles are as follows:

• If the premium varies with losses and is sufficiently responsive, the policy is considered "loss-sensitive."

• If the primary policy's commission varies with losses (e.g., contingent commissions), the policy is not considered a loss-sensitive contract. [Contingent commissions on direct business generally have narrow "swings," so the sensitivity to losses is limited.]

• If the reinsurance treaty's commission varies with losses (e.g., sliding scale commissions), the policy may be considered a loss-sensitive contract. However, since the average responsiveness of reinsurance commissions and premiums to losses differs from the average responsiveness of primary premiums to losses, separate offsets are used for direct and for assumed business, and separate Part 7 exhibits are shown for primary business and reinsurance business.

• Varying dividend rates do not make a policy "loss-sensitive." [Policyholder dividends are generally optional, not contractual.]

Part 7A shows net experience on primary loss-sensitive contracts, and Part 7B shows net experience on reinsurance loss-sensitive contracts, since the risk-based capital offsets differ by primary and reinsurance businesses. No other section of Schedule P separates primary and reinsurance business in this fashion.

The Part 7 historical exhibits are for all lines of business combined. Many loss-sensitive contracts for large policyholders are composed on a multi-line basis. Since the purpose of Part 7 is to quantify premium sensitivity, and since this sensitivity is not expected to vary significantly by line of business, obtaining detail by line of business would be expensive and unnecessary.

**Definition of Loss-Sensitive Contracts**

The risk-based capital underwriting risk factors are applied to loss reserves and to written premium, so Section 1 of Parts 7A and 7B...
determines the percentage of loss reserves and of written premium by line of business that relates to loss-sensitive business. Since the risk-based capital requirements are lower for loss-sensitive business, distressed companies have an incentive to classify their business as loss-sensitive, even if the loss-sensitivity is minimal. For instance, a company may offer a $10 premium rebate for insureds with claim-free experience.

To be classified as loss-sensitive, a contract must therefore fulfill the following six criteria:

1. **An increase in losses can lead to an increase in net payment for that policy.** In other words, if the loss-sensitive item is not a monetary transaction, the contract is not loss-sensitive.

2. **The loss sensitive payment must be at least 75 percent of the loss on primary business and at least 50 percent of the loss on reinsurance treaties, before the application of any limits.** In other words, if losses on a retrospectively rated workers' compensation policy increase by $10,000, the retrospective premium must increase by at least $7,500, before the application of loss limits or maximum premium caps.

3. **Maximum and minimum premiums, loss limits, and upper and lower bounds on the reinsurance commission may constrain an otherwise "loss sensitive" contract.** For a contract to be classified as loss sensitive, the "swing" of the plan must be at least 20 percent for primary business and 10 percent for reinsurance treaties. In other words, the net amount payable when the loss experience is the worst possible must be at least 20 percent greater than the net amount payable when the loss experience is the best possible. For example, a retrospectively rated workers' compensation policy with a minimum premium of $9,000 and a maximum premium of $10,000 would not qualify as loss sensitive.

4. **The maximum net payment must be at least 15 percent greater than the expected net payment for primary business and at least 7.5 percent greater than the expected net payment for reinsurance treaties.** For example, a retrospectively rated workers' compensation policy with a minimum premium of $5,000, an expected premium of $10,000, and a maximum
premium of $11,000 would qualify as loss sensitive under criterion number 3 but not under criterion number 4.

5. The loss sensitive payments must be either premiums or commissions. In other words, a policy with loss sensitive policyholder dividends does not qualify as "loss sensitive."

6. The losses and the corresponding loss sensitive payments must flow through the income statement and the balance sheet. In other words, suppose the workers' compensation policy has a large dollar deductible of $100,000. For losses below $100,000, the insurance company still settles the claim and pays the benefits, but the insured reimburses the insurer for these payments. One might characterize this policy as loss sensitive, since the greater the losses paid by the insurer, the greater the payments made by the insured. However, these amounts do not flow through the income statement as incurred losses and as premiums, so the contract does not qualify as loss sensitive.

Sections 2 through 5 for primary contracts, and Sections 2 through 7 for reinsurance contracts, provide data to help quantify the sensitivity of premiums and reinsurance commissions to losses on an all-lines combined basis. These exhibits include data only for loss-sensitive contracts:

- Sections 2 and 3 show incurred losses and bulk loss reserves. They are similar to the Part 2 and Part 4 exhibits, except that the experience is subdivided by policy year, not by accident year.

- Section 4 shows earned premiums. It is similar to Part 6, except that policy year experience is shown, not exposure year experience. It is unclear if the "prior years" row in Section 4 is like the "prior years" row in Part 2 (i.e., cumulative experience) or like the "prior years" row in Part 6 (i.e., incremental experience).

- Section 5 shows bulk premium reserves. In general, companies do not hold "case basis" premium reserves. However, they do hold "policy basis" unearned premium reserves reflecting the actual premiums they have received as written on each policy. Bulk premium reserves are the equivalent of the Section 3 bulk
loss reserves, reflecting additional premiums (positive or negative) anticipated due to audits and other retrospective adjustments.

- Sections 6 and 7 of Part 7B show reinsurance commission exhibits similar to the premium exhibits in Sections 4 and 5.

Uses of the Exhibits

These exhibits may be used to quantify either (a) the sensitivity of billed premiums to reported losses or (b) the sensitivity of earned premiums to incurred losses. The former is a direct estimate of premium sensitivity in the loss-sensitive contract. The latter figure is directly relevant to the risk-based capital formula, though it is difficult to quantify.

A retrospective rating plan might say that the premium is a linear function of the incurred losses, subject to maximum and minimum bounds, or:

\[
\text{billed premium} = \text{basic premium} + (\text{loss conversion factor}) \times (\text{incurred losses})
\]

The incurred losses do not include any bulk loss reserves or IBNR loss reserves. Similarly, the billed premium does not include any accrued retrospective premiums, or EBRR premium reserves.

As IBNR claims emerge, or as known claims develop to ultimate, additional premium may be billed. The amount of additional premium depends on the coefficient of incurred losses in the retrospective rating plan (i.e., the loss conversion factor), as well as on any loss limits, premium maximums, and premium minimums. The more mature the losses are (i.e., the longer since the inception of the policy year), the more likely it is that the effects of adverse loss development on the retrospective premium will be capped by the loss limits. Similarly, the higher the loss ratio, the more likely it is that the effects of adverse loss development on the retrospective premium will be capped by the premium maximum.

The Part 7 historical triangles would be used in the following manner:

1. Section 2 shows incurred losses, and Section 3 shows bulk loss reserves. Section 2 minus Section 3 is therefore the reported losses on a cumulative basis (similar to Part 2 minus
Actuarial Reserving and Financial Regulation

Part 4). The first difference between adjoining columns shows incremental reported losses. For instance, in the 1995 Schedule P, the difference between column 11 and column 10 in Section 2 minus Section 3 shows the increase in reported losses in 1995.

2. Section 4 shows earned premium, and Section 5 shows bulk premium reserves. Section 4 minus Section 5 shows billed premium on a cumulative basis. The first difference between adjoining columns shows incremental billed premium. For instance, in the 1995 Schedule P, the difference between column 11 and column 10 in Section 4 minus Section 5 shows the increase in billed premium in 1995.

3. The ratios of the figures in #2 above to those in #1 above show the sensitivity of premium to losses. The normal lag in retrospective adjustments means that the billed premiums are based on reported losses of three to six months earlier. Since both premiums and losses use year-end data in the Part 7 exhibits, some distortions may be caused by the premium billing lag.50

The procedure outlined above is consistent with the workings of loss-sensitive contracts, but it does not mirror the loss-sensitive contract offset in the risk-based capital formula. The loss-sensitive contract offset asks: "To what extent are unanticipated increases in ultimate incurred losses offset by increases in ultimate earned premium?"

Accordingly, the analyst may compare the incremental differences between the columns in Section 2 (incurred losses) with the incremental differences between the columns in Section 4 (earned premium). The ratio of the latter to the former is also a measure of the sensitivity of premiums to losses on loss-sensitive contracts.

This alternative analysis is of questionable validity. For a well reserved company, the incremental differences in both Section 2 and Section 4 should be small, either positive or negative, due primarily to random fluctuations. The ratios of these numbers may be small.

50. As Stephen Lowe has pointed out to me, over the entire development period, these distortions will "wash." They are important primarily for individual company premium reserve estimates, as well as for comparisons of actuarial reserve projections with subsequent experience.
or large, positive or negative, and not always meaningful. This may be more a measurement of random fluctuations and of reserving philosophy than of premium sensitivity.

This test will be of greatest value if and when the company (or the industry) suffers significant adverse loss development, as is inherent in the risk-based capital provision. Only then will analysts be able to see how the premium on loss-sensitive contracts responds to unanticipated increases in losses.

Schedule P Interrogatories

The Schedule P Interrogatories contain eight questions. Five of these are discussed above along with the relevant Schedule P exhibits:

1. Schedule P penalties for Automobile Liability, Other Liability and Products Liability, Medical Malpractice, Workers' Compensation, and Credit.

2. Extended loss and expense reserves on claims-made policies.

3. The distribution of unallocated loss adjustment expenses paid by accident year.

4. Reserve reported gross and net of discount.

5. Claim count information.

Two questions are for information only:

6. The definition of "loss expense."


The eighth question relates to estimates of reserve adequacy:

8. The information provided in Schedule P will be used by many persons to estimate the adequacy of the current loss and expense reserves, among other things. Are there any especially significant events, coverage, retention or accounting changes which have occurred which must be considered when making such analyses?

The NAIC left this question quite general, so that companies would describe freely any changes in their experience. The NAIC
Instructions list several items that should be described in this inter-
rogatory:

- A change in the method of counting claims,
- The intercompany pooling of only a portion of the business,
- Changes in the intercompany pooling arrangement.

Other material changes should also be noted. For example, if a
company revises its tabular discount for permanent disability in-
demnity benefits on Workers' Compensation claims, either by
changing the interest rate or by discounting different blocks of
claims, this should be noted.

**Reserve Margins**

Calendar year underwriting results for the long-tailed lines of busi-
ness are influenced by the adequacy of reserve margins for previously
reported claims and by the strength of case and bulk reserves for
newly reported claims. If the held reserves at the beginning of the
calendar year were inadequate, the adverse loss development will
dampen the current year's reported results. Conversely, if inadequate
reserves are set up for newly reported claims, the calendar year re-
ported results will look better than they actually are.

Ultimate claim costs in the liability lines of business are difficult
to predict, since they are influenced by numerous external factors,
such as unexpected judicial decisions, new causes of action, and so-
cial developments affecting claims consciousness and jury awards.
Moreover, insurance underwriting cycles may lead company man-
gements to smooth reported earnings by alternately strengthening
and weakening loss reserves.\(^1\)

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51. Compare Bates, 1989, p 15: "Insurers cut under-reserve when results are wors-
ening and over-reserve when profits improve. It isn't clear whether management is
overriding actuarial indications or actuaries are bowing to pressures to smooth re-
ported income." Cholinsky and Cohen, 1989A, pp 1-3, note the same phenomenon:
"Accuracy and adequacy of loss reserves tend to fluctuate over the course of the un-
derwriting cycle... Companies typically under-reserve current accident years dur-
ing a downcycle. They may also release prior accident year reserves to support earn-
ings. In an upcycle, companies reverse this process: they over-reserve current accident
years and strengthen prior years." Bolzarek, 1966, p 8, comments on the propriety of these practices: "A question
remains whether insurance companies use their reserve margins to stabilize their
Schedule P allows one to compare reported calendar year results with actual accident year results. Calendar year results are shown in the Underwriting and Investment Exhibits for net earned premiums on Part 2, column 4, and net losses incurred on Part 3, column 7. The corresponding calendar/accident year figures are shown in Schedule P, Part 1, columns 4 and 27. The accompanying chart illustrates the smoothing of Workers' Compensation industry wide accident year loss ratios in reported calendar year results during the 1980s. The unbroken line shows accident year loss plus expense ratios; the dotted line shows the reported calendar year results.52

Statement of Actuarial Opinion

Loss reserves are sometimes inadequate, and under-reserving has been a contributing factor to many insurance insolvencies (Best's, results. The writer realizes that many people regard with horror the idea that one should adjust reserve margins according to the size of the loss ratio. Yet emotions are a poor basis for making sound business judgments. Looking at the matter from a logical point of view, there does not seem to be anything objectionable in increasing reserve safety margins during years of good underwriting results. Conversely, there should be no objections to reductions of these margins in time of poor experience in order to soften its impact, as long as loss reserves are fully adequate and the company has a sufficient amount of surplus for the type and amount of business it conducts.” 52. The data are from Best’s [1990], pages 76 and 107. See NCCI [1991], pages 30-31 and Ryan and Fein [1988], pages 47-48, for discussions of this phenomenon.
1991; AAA, 1991, p. 166; Hartman, 1992). To enhance the accuracy of loss reserve estimates, a Statement of Actuarial Opinion Regarding Loss and Loss Adjustment Expense Reserves must accompany the Annual Statement. This statement is signed by a qualified actuary appointed by the company's Board of Directors. Each year, the actuary presents a report to the Board of Directors explaining the procedures used to arrive at the opinion and the conclusions embodied in it [NAIC Blanks Task Force, Attachment N of October 1991 meeting, Lamb, 1991, 1992; Wicraft, 1992].

The statement of opinion must comment on the reasonableness of the reserves for:

- net unpaid losses,
- net unpaid loss adjustment expenses,
- direct and assumed unpaid losses, and
- direct and assumed unpaid loss adjustment expenses.

Scope of the Statement

Annual Statement Instruction 12, paragraph (11), describes the scope of the statement:

The actuary should comment in the scope section on each of the following topics, describing the effect of each on loss or loss expense reserves: discounting, salvage/subrogation, underwriting pools or associations, loss portfolio transfer, financial reinsurance, and reinsurance collectibility. The actuary should also comment on and describe the effects of any additional topics which in the actuary's judgment materially affect loss or loss expense reserves. If the company reserves will create exceptional values using the NAIC IRIS tests 9 (One Year Reserve Development to Surplus), 10 (Two Year Reserve Development to Surplus) and 11 (Estimated Current Reserve Deficiency to Surplus), the actuary should include an explanation.

The following topics affect the Schedule 2 entries:

- **Discounting**: Loss reserve discounts must be disclosed in the Notes to the Financial Statements. In the Statement of Opinion, the actuary should comment on both tabular discounts,
which may affect Workers' Compensation and Accident A. Health loss reserves in Parts 1, 2, and 4, and non-tabular discounts, which may appear in columns 31 and 32 of Part 1 for all lines of business.

- **Pools and Associations**: The ceded and assumed entries in Schedule P include amounts for voluntary and involuntary pools, some of which may be large, such as those for workers' compensation residual markets. The appointed actuary must comment whether the company uses the pool's estimates of required or booked reserves, or whether the company independently estimates the needed reserves.

- **Salvage and Subrogation**: Anticipate salvage and subrogation recoveries are shown in Schedule P, Part 1, column 21, and they must be commented upon in the Statement of Actuarial Opinion.

- **Loss Portfolio Transfers and Financial Reinsurance**: Loss portfolio transfers denote the transfer of financial obligation for losses that have already occurred whereby the primary company's surplus is increased and the consideration paid to the reinsurer is determined by present value techniques. Financial reinsurance refers to arrangements in which the reinsurance company does not incur timing and underwriting risk. Schedule P loss reserves must be reported gross of any loss portfolio transfers. Similarly, a lack of timing and underwriting risk precludes a transaction from being considered reinsurance in statutory reports.

- **Reinsurance Collectibility**: Part 1 shows both gross and net loss reserves, but it does not indicate the expected collectibility of reinsurance recoverables. Schedule F imposes statutory penalties for unauthorized and slow-paying reinsurers and for overdue reinsurance (Simon and Viner, 1992; Feldblum, 1995). The Statement of Actuarial Opinion should comment on any anticipated collection problems on these as well as on other recoverables.

Paragraph 13 of Instruction 12 discusses changes to the reserve estimation procedures:
If there has been any material change in the actuarial assumptions and/or methods from those previously employed, that change should be described in the statement of actuarial opinion.

The paid and incurred loss development analyses described above are means of testing reserve adequacy using Schedule P data. Other methods may have been used to set the reserves, incorporating claim counts and average severities, expected loss ratios, or probability distributions. The data may have been segmented by jurisdiction (e.g., tort vs. no-fault states in Personal Auto Liability), type of benefit (e.g., indemnity vs. medical benefits in Workers' Compensation), or coverage (e.g., property vs. liability in CMF). In the report to the Board of Directors, the appointed actuary should comment on the methods used to estimate the reserves (Instruction 12, paragraph 2).

Conclusion

Schedule P is a complex document, requiring careful examination for its completeness and sophisticated analysis for its understanding. Working with Schedule P can be a satisfying experience, if one understands its intricacies and the interrelationships of its parts. But this experience can be frustrating if one is unprepared or if the data do not match those in previous years or elsewhere in the Annual Statement. A full understanding of this Schedule should ease the company's task and help avoid needless pitfalls.

References


Endnotes

a. Reinsurance A, B, and C correspond to the "2 year," "10 year," and financial lines of business, with the following exceptions: (1) Ocean marine and boiler and ma.
chinery which are part of the “Special Liability” line, are included in Reinsurance A.
(2) Credit, which is part of the “Other” line, is included in Reinsurance C. (3) Interna-
tional is divided among Reinsurance A, B, and C according to the type of business
reinsured. For a complete listing of the lines, see the NAIC Instructions.

b. See the NAIC Instructions, p. 57-1. “Since the summary of each part contains
years of development, the information from the ‘Prior’ base in the Property Lines,
Sections 1 through 8, must be supplemented for the eight accident years preceding
the two most recent years.” One widely used Schedule P software package therefore
shows 10 accident years, a “two year prior base,” and a “10 year prior base” for the
property lines of businesses.

c. Restatements of individual company data resulting from changes in intercom-
pany pooling agreements would hinder the compilation of historical triangles, see
the discussion of Part 1, column 32.

d. Most insurers keep direct premium and loss statistics by calendar year and
accident year. Ceded and assumed statistics are often available only by fiscal year or
contract year, and some carriers estimate figures for the final months of the calendar
year as accident year. For instance, involvement market reinsurance pools in Workmen’s
Compensation and Commercial Auto policies for fiscal years ending September 30 and
August 31, respectively. In addition, Schedule P, the results of the fiscal year experience—
assumed and ceded premiums and losses—subtract the estimates added at the last
Statement date, and add estimated figures for the remainder of the current calendar
year.

The estimates must then be allocated to accident year. Voluntary market statisti-
ces may be a poor base for the involuntary market allocation to accident year if these
markets are growing at different rates. In Workmen’s Compensation, for instance, the
involuntary pools in many jurisdictions were expanding rapidly from 1986 through
1991, followed by a leveling-off and even a decline in some states. To allocate the
estimates of involuntary market reinsurance pool premiums and losses by accident
year, one must adjust the distributions for differing growth rates by calendar year and
market.

c. That is, the additional premiums in excess of the estimated EINR reserve
calculated at the end of the accounting period when the premiums were earned. The
EINR reserve is shown in the “Underwriting and Investment Exhibits,” Part 2A, “Re-
capitalization of All Premiums,” column 4, “Reserve for Rate Credits and Retrospective
Adjustments Based on Experience.”

d. The latest calendar year net earned premium shown in Schedule P, Part 1,
column 4, row 11, for each line of business must equal the net earned premium shown
on page 7, “Underwriting and Investment Exhibits,” Part 2, “Premium Earned,” col-
umn 4. Premium figures from earlier years must agree with the figures in the preced-
ing year’s Annual Statement. It there is an intercompany pooling agreement that has
changed over time, then the comparison with earlier Annual Statements can be done
only on a consolidated basis. See the discussion in the text on intercompany pooling.

e. The crosschecks are as follows:

A. Schedule P, Part 1, line 12, columns 5-6, in the 1995 Annual Statement
shows cumulative net loss payments for accident years 1986 through 1995 as
years before 1986. [Note that for accident year 1995, the cumulative loss payments
equal the calendar year 1995 loss payments for that accident year.]

b. Schedule P, Part 1, columns 5-6, lines 5 through 11, in the 1994 Annual
Statement shows cumulative net loss payments for accident years 1986
C. The difference between A and B is the calendar year 1995 loss payments for all accident years. This figure should equal the entry in Part 3, column 4, of the "Underwriting and Investment Exhibits." A similar cross-check applies to loss adjustment expenses, though only for all lines of business combined. In the Schedule P, Part 1 Summary, columns 5 - 8 = 10 is used instead of columns 5 - 6. Part 4, column 1, line 27, of Part 4 of the "Underwriting and Investment Exhibits," shows the loss adjustment expenses paid in the most recent calendar year. This figure should equal the calendar year payments derived from the current and previous Schedule P's.

5. Note also that loss-based assessments (for workers' compensation second injury funds) are often recorded as losses and allocated to accident years.

6. Troxel and Breslin, 1983, p. 130, comment: "... the unpaid ULAS for a workers' compensation claim will probably be less than 50 percent since a large reserve is often established for related monthly payments which may little IB\AE. See also Salzmann, 1967, p 125. "The present percentages used to distribute unallocated claims expense... in Schedule P are arbitrary. Industry studies might be undertaken to determine unallocated claims expense distributions by size of claim and by age of claim." For further explanation of the current procedure, see Salzmann, 1988, p. 83.

1. The NAIC Instructions list four categories of bulk reserves. "The bulk and BNR reserves for losses and allocated loss expenses are intended to include reserves for incurred but not reported claims, for reopens, for development on case reserves of reported claims, and for aggregate reserves on newly reported claims without specific case reserves" (1995, p. 318). Salzmann, 1984, p. 13, uses the terms IBNR (= incurred but not enough reported) for all bulk reserves and BNR/BYR (= incurred but not yet reported) for "pure" BNR.

Although Schedule P does not distinguish between true IBNR and other bulk reserves, the Underwriting and Investment Exhibit, Part 3A, Unpaid Losses and Loss Adjustment Expense, shows separate numbers for each component. Columns 1a, 1b, 2, 3, and 3, show reserves for reported cases; 4 (Adjusted or in Process of Adjustment) for direct, assumed, ceded, and net business. Columns 4a, 4b, and 4c show BNR reserves for direct, assumed, and ceded business.

Some insurers, however, show all bulk reserves in columns 4a, 4b, and 4c, consistent with the reporting in Schedule P. The NAIC Instructions provide very brief guidance. For columns 1a and 1b: "Adjusted or in the Process of Adjustment," the Instructions say: "Include: All losses which have been reported in any way to the Home Office of the company on or before December 31 of the current year. Provision for losses of the current or prior years, if any, reported after that date would be made in Columns 4a and 4b as Incurred But Not Reported." For columns 4a, 4b, and 4c: "Incurred but Not Reported," the Instructions conclude: "Incurred but not reported reserve estimates should be sufficient to cover claims which may be reopened in future periods." The Instructions do not state explicitly where development on case reserves is to be included.

The cross-checks between Schedule P, Part 1, and Part 3A of the Underwriting and Investment Exhibits are as follows: The sum of columns 15 and 15 in Schedule P, Part 1, row 12, should equal the sum of columns 1a, 1b, 4a, and 4b in Part 3A. The sum of columns 14 and 16 in Schedule P, Part 1, row 12, should equal the sum of columns 1 and 4c in Part 3A. Columns 17 = 18 + 19 + 20 + 21 in Schedule P, Part 1, row 12, should equal column 6 in Part 3A.

If a carrier uses the same split between "case" and "IBNR" reserves on row 10 as in Schedule P, then the cross checks are simpler: column 13 in Schedule P, Part 1, row 1c, should equal the sum of columns 1a and 1b in Part 3A, and so forth.
k. Loss adjustment expense reserves can be checked against the "Underwriting and Investment Exhibit," Schedule P, Part I, line 13, columns 17 - 18 + 19 - 20 + 32 should equal the corresponding entries in Part 3A of the Underwriting and Investment Exhibit, column 6.

l. The figures in columns 34 and 35 must match the corresponding entries in the "Underwriting and Investment Exhibit," Part 3A, "Unpaid Losses and Loss Adjustment Expenses." Column 34 should equal column 5 in Part 3A, and column 35 should equal column 6 in Part 3A.

m. Before 1989, Personal and Commercial Automobile liabilities were combined on Schedule P, so the excess statutory reserves were determined from the combined loss rates. Although Personal and Commercial Automobile liability are now shown separately in Schedule P, they are still combined for calculating the excess statutory reserve. Similarly, Other Liability and Production Liability were a single Annual Statement line until 1991, and they continue to be combined for the excess statutory reserve test.

n. Specifically, the policyholders’ surplus at the end of the prior year is shown on page 3, "Liabilities, Surplus and Other Funds," line 25. "Surplus as regards policyholders," "prior year," column, page 4, "Statement of Income," line 17. "Surplus as regards policyholders, December 31 previous year," "current year" column. The IRS test ratio is entered on page 23, "Five Year Historical Data," line 63. "Percent of Development of Loss and Loss Expenses Incurred to Policyholders’ Surplus of Previous Year End." The policyholders’ surplus at the end of the current year is shown on line 4, line 17, "prior year" column. The IRS test 10 ratio is entered on page 33, line 65. "Percent of Development of Loss and Loss Expenses Incurred to Policyholders’ Surplus of Current Year End."

o. Now the NASC Instructions: "Part 2, Prior is equal to Part 3 ‘Prior’ plus the reserves outstanding at the end of the respective reporting years . . . "
Introduction


Loss reserve discounting is one of the most controversial issues among casualty actuaries, insurance accountants, and state regulators. Lowe and Philbrick's seminal article, "Issues Associated with the Discounting of Property/Casualty Loss Reserves," which is the centerpiece of the reserve discounting section of the CAS Part 7 examination syllabus, has helped educate thousands of new actuaries on the pros and cons of various loss reserve valuation procedures and the accounting implications associated with them. The continuing actuarial focus on this issue is highlighted by the recent "Point-Counterpoint" debate between Stephen Philbrick and Ron Ferguson in the Actuarial Review and by the numerous papers on this topic that appear each year.

When Lowe and Philbrick wrote this paper in the mid-1980s, the various accounting systems—statutory, GAAP, and tax—required undiscounted reserves for almost all loss liabilities. The authors asked theoretical questions: "Should one report loss reserves on a discounted basis? What are the economic and accounting arguments for and against discounting?" Practice has since out-run theory. The landscape now differs sharply, and the actuarial debate has shifted from "Should one discount?" to "How should one discount?"

In particular, three issues are paramount:

- What discount rate should be used to determine the present value of the loss reserves? In particular, what type of "risk adjustment" if any, should be applied to a risk-free rate to determine the appropriate discount rate for volatile loss reserves?
- How should the loss reserve payout pattern be determined? Should one use ratios of paid to incurred losses, historical loss payment triangles, or curve fitting techniques?
- In lieu of a risk-adjusted discount rate, or in addition to it, should an explicit margin of conservatism be included in the estimate of the ultimate loss or of the payment pattern?
The gist of the Lowe and Philbrick paper is that underlying economic forces will ultimately force the insurance industry to value loss reserves on a discounted basis. The various accounting systems have been traveling along different but parallel paths, sometimes slowly and sometimes quickly, sometimes explicitly and sometimes implicitly. The paths lead, however, to a common destination: users of financial statements need the “economic” value of loss reserves, not merely a nominal value. Let us trace the course of the three insurance accounting systems over the ten years since Lowe and Philbrick published their paper.

Tax accounting

The use of undiscouted reserves enabled property-casualty insurers to escape federal income taxes during the 1970s and early 1980s, much to the disconcert of the Internal Revenue Service. The Congress “remedied” this situation with the Tax Reform Act of 1986, which allows only the annual change in discounted reserves as an offset to taxable income for the year.

The Internal Revenue Code (IRC) provides detailed procedures for determining discounted loss reserves. Most important are the choice of the discount rate and the determination of the loss reserve payout pattern.

For the discount rate, the IRC uses a 60 month moving average of the federal midterm rate, which is defined as the rate on Treasury securities with maturities between 3 and 9 years. This is essentially the portfolio rate on risk-free securities with durations about equal to that of property-casualty loss reserves.

Casualty actuaries have questioned this choice. Lowe and Philbrick show how the choice of discount rate affects the incidence of profit. This is particularly important for tax accounting, since the timing of profits in taxable income affects the tax liability due each year and therefore the amount of investment income on the company’s assets.

Most notably, Robert Butsic has argued that the economic value of loss reserves is not the present value of the reserves discounted at a risk-free rate. Rather, it is the present value of the reserves discounted at a risk-adjusted rate, which Butsic calculates as about

three to four hundred basis points. Butsic's risk adjustment to the
loss reserve discount rate is a fundamental component of the finan-
cial pricing of insurance contracts, in addition to its use in loss re-
serve valuation.

The loss payment pattern used by the IRC has also drawn fire.
To determine the loss payment pattern, the IRC uses the ratios of
paid losses to incurred losses by accident year from Part I of Sched-
ule P. The loss reserve "payout pattern" derived from this procedure
depends not only on cash flow patterns but also on loss reserve ad-
curacy. Furthermore, it sometimes produces negative (and therefore
meaningless) figures, such as "1.5% of losses are paid in the 8th
year." Many casualty actuaries prefer to use historical paid loss tri-
angles to determine payment patterns, as are shown in Schedule P,
Part 3.

GAAP

When Lowe and Philbrick wrote their paper in the mid-1980s, GAAP
valuation procedures for the major balance sheet entities closely fol-
lowed statutory accounting procedures, both for assets and liabil-
ties. The major differences were for items that were explicitly ac-
nowledged as statutory peculiarities, such as "overdue agents' balan-
ces" on the asset side and the "excess of statutory reserves over
statement reserves" on the liability side.

The two accounting systems are now diverging rapidly, taking
different paths to the common goal of more accurately valuing the
worth of the insurance enterprise.

In December 1990, the Financial Accounting Standards Board
(FASB) of the American Institute of Certified Public Accountants
(AICPA) issued a Discussion Memorandum on Present Value-Based
Measurements in Accounting. The Discussion Memorandum deals
with accounting for various types of future obligations, not just prop-
erty-casualty loss liabilities. Insurance loss liabilities, however, lie
at the center of the present value accounting debate, and this topic
receives extensive treatment in the Discussion Memorandum. Most
important, the Discussion Memorandum goes beyond the question

HGS, Casualty Actuarial Society 1988 Discussion Paper Program, pp 147-188. But-
sic's perspective has been adopted by the American Academy of Actuaries Standard
of Practice No. 20, "Discounting of Property and Casualty Loss and Loss Adjustment
Expense Reserves."
of "Should reserves be discounted?" to the question (following But-sic) of whether risk adjustments, if any, should be applied to the discount rate.

In December 1993, the PASB issued Financial Accounting Standard 115, which changes the valuation basis for most fixed income securities from amortized value to market value.2 There was much discussion of revising the valuation of liabilities from nominal value to market value as well. However, because there is no open market for insurance liabilities, market values are not easily determined. Determining the "fair value of liabilities" has since become a major project for both actuaries and accountants dealing with GAAP financial statements.

Modern financial theory implies that in a robust market, the value of a given set of liabilities should reflect the consensus of buyers and sellers with regard to:

- the expected amounts of future payments in settlement of those liabilities,
- the expected timing of those payments,
- the uncertainty as to the amounts of those payments, and
- the uncertainty as to the timing of the payments.

We can not know how the buyers and sellers perform their individual valuations. Moreover, it is not necessary that the valuations consider each of these elements separately; it suffices if the elements are considered collectively in the valuation. However, we can develop valuation models that rationally consider each of these elements, and we use the models to generate proxies for market values.

Because discounted values explicitly account for the timing of loss payments, they are a better proxy for market values than undiscounted values, and one may expect the AICPA to ultimately embrace a discounted valuation basis.

Statutory Accounting

Statutory accounting, once renowned for its plodding pace, has moved rapidly in recent years—even if covertly—with regard to the

2. The valuation basis for fixed income securities intended to be held to maturity remains amortized value. Fixed income securities that are held for "trading purposes" or that are "available for sale" are valued at market. On statutory financial statements, all investment grade fixed income securities in good standing are valued on an amortized basis.
valuation of loss reserves. Property-casualty insurers must show undiscounted reserves in their Annual Statements. The most common rationale for this is that undiscounted reserves provide an implicit "interest cushion" which protects the insurer against unanticipated adverse loss development and thereby protects policyholders and claimants against the effects of insurer insolvency.

In December 1994, the NAIC implemented its risk-based capital reporting requirements. Capital requirements will be determined by the risk-based capital formula, not by minimum capital and surplus statutes or by margins in statutory balance sheet entries.

The risk-based capital formula values loss reserves on a discounted basis. In other words, solvency monitoring by state insurance regulators begins with discounted loss reserves, not with full-value reserves. The loss reserve cushion is no longer the implicit difference between full value and discounted reserves but an explicit cushion set the risk-based capital formula.

The risk-based capital formula uses the IRS loss reserve discounting procedure, with two differences. First, the discount rate is set at 5 percent per annum, thereby providing an additional solvency "cushion." In contrast, the IRS discount rate has averaged about 7 to 8 percent, providing higher tax liabilities. Second, curve fitting techniques are used to determine the loss reserve payout pattern for the non-proportional reinsurance lines of business, and adjustments are made for workers’ compensation tabular loss reserve discounts.

Relevance

Some papers grow out of date with time. Other papers become more relevant as practice catches up with the authors’ predictions.

The Lowe and Philbrick paper discusses the pros and cons of loss reserve discounting. It then shows the effects that different loss reserve valuation bases—that is, different discount rates—have on the financial statements each year.

When the Journal of Insurance Regulation first published this paper, the issues were theoretical, since accounting standards required insurers to hold undiscounted reserves. Now that the major accounting systems are rapidly heading toward a discounted loss reserve valuation basis, the issues raised by Lowe and Philbrick become central for establishing appropriate valuation bases.
Issues Associated with the Discounting of Property/Casualty Loss Reserves

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Abstract

In this report the authors examine the financial, economic and regulatory issues associated with the discounting of property/casualty loss reserves. The historical rationale for the use of undiscounted loss reserves is described, and data is presented that illustrates why changes in economic conditions may make it appropriate to reconsider that rationale. The authors conclude that the use of discounted reserves with conservative assumptions would result in financial statements that are more reflective of underlying economic conditions, and provide a more meaningful presentation of operating results by more closely matching revenue and expense. It is their contention that this can be accomplished while still satisfying the regulatory objective of insurance solvency; it is also suggested that current industry activities in the areas of implicit discounting and portfolio reinsurance imply that the market will not support the capital costs associated with full-value reserves.

Section I

Introduction

Whether property/casualty loss and loss expense reserves should be discounted to reflect the time value of money has received an in-

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creasing amount of critical attention during the last decade. Regulators, accountants, actuaries, investment analysts, and company managers have all participated in the discussion of that issue. At one time or another, various proposals have been put forth to discount property/casualty loss and loss expense reserves for Generally Accepted Accounting Principles (or "GAAP"), statutory or tax reporting purposes.

The discounting issue is a controversial one. There are today both strong proponents and strong opponents of the concept. It should also be recognized that neither the proponents nor the opponents are composed predominantly of any one special interest group; rather, legitimate differences of opinion exist as to whether discounting is appropriate within each of the regulatory, accounting, actuarial and management communities.

Clearly, the controversy would not have continued for so long if the topic and associated issues were not complex. Use of discounted reserves would represent a fundamental change in presentation of an insurance company's operating results and financial position. The mechanics of discounting would add an additional layer of complexity to the setting of reserves. And, since financial statements are used differently by different audiences, reasonable differences in perspective exist, resulting in differing attitudes and conclusions regarding this issue.

Interest in the general subject of the recognition of the time value of money in accounting statements of all industries has also been increasing. The approach has been achieving wider use and greater acceptance within the general community of financial statement preparers and users. This is at least partially attributable to the higher interest rates that have prevailed over the last few years, which have made the time value of money a more material consideration in financial statement presentation.

Simplification has increased markedly regarding the mechanics and implications of discounting. The subject is now routinely included in the college curricula of business, economics and other major disciplines. Accounting literature in this area is also increasing.

This report will explore the issues that underlie the discounting of loss reserves, by providing an objective presentation of the issues and arguments that arise out of the debate. The report is divided into three principal sections. This first section provides historical background as well as a discussion of current activity and practice. The second section outlines the principal arguments pro and con. Finally,
the third section draws conclusions. Also included as part of the report is an Appendix which presents by a series of examples illustrations of the balance sheet and income statement effects of discounting.

**Historical Perspective**

The traditional reporting basis of full value reserves stems partly from the significantly lower level of interest rates that prevailed through the 1950s and partly from the historical viewpoint that property/casualty insurance policies are short duration contracts. At the time that these traditions were developing, losses during the contract period were generally settled relatively promptly. In these circumstances it was not necessary to adopt an accounting policy that recognized the time value of money.

This approach can be contrasted with that of the life insurance industry. Because historically life insurance has been viewed as a long-term contract, the accounting policy that has evolved has recognized the time value of money through the discounting of policy reserve liabilities. This approach is considered essential to the preparation of meaningful financial statements. A similar philosophy underlies the accounting treatment of pension funds.

More generally, in the accounting for short-term contracts outside of the insurance industry, the time value of money has traditionally not been recognized, principally because the investment opportunity was so limited. This tradition arose during a period when the level of interest rates was significantly lower than it is today; interest rates from 1926 up to 1965 were generally in the two percent to four percent range. With interest rates now in the eight percent to 12 percent range, even contracts with a one or two year duration, present an investment opportunity.

Liability insurance policies provide for defense and settlement of claims on the insured's behalf. The time required for reporting and disposing of these claims has lengthened substantially over the last few decades. While the claims may have all arisen from occurrences within a single policy period, claims often are not fully paid and disposed of as long as 10 years later. Such policies can no longer be considered short term in their duration. Similar arguments apply to other "long-tail" lines, such as workers' compensation, marine and aviation, and excess reinsurance.
FIGURE 1
Stock Industry Totals — Investment Income on Insurance Operations

Percent of Earned Premium

Calendar Year
For the property/casualty industry as a whole, the lengthening of the claim disposal period coupled with the dramatic rise in interest rates has made the time value of money a major part of the return on the product. Figure 1 illustrates this point graphically. That exhibit shows the estimated investment income attributable to the insurance cash flow, expressed as a percentage of the premium, over the period from 1940 to 1985. As can be seen, until 1970 investment income from insurance was roughly three percent of premiums. However, since 1970 investment income as a percentage of premium has increased dramatically. In 1985, it is estimated that investment income from insurance operations will be roughly 12 percent of premiums.¹

Figure 1 demonstrates clearly the point that the investment income potential of property/casualty insurance products has reached the point where it is a material contribution to the industry’s total return.

Current Activity

A variety of organizations have studied the discounting of property/liability loss reserves. Examples of the more recent studies of this nature include:

- The accounting profession has engaged in serious study of the discounting issue for a number of years. The American Institute of Certified Public Accountants (or “AICPA”) has formed a variety of special study groups to consider the appropriateness of the current accounting treatment of loss reserves, and to consider the alternatives. Its most recent task force was formed in 1985 to look at the use and application of discounting, both in general terms, and specifically in the area of property/casualty loss reserves. This task force is expected to release its conclusions in early 1986.
- Both the Treasury Department and the General Accounting Office have studied whether reserves should be discounted for federal income tax reporting purposes. In 1985, both organi-

¹. Note that Figure 1 excludes the estimated portion of investment income that is attributable to the investment of the industry’s surplus because this latter investment income would be earned regardless of the investment potential presented by the cash flow from the insurance policies written by the industry.
nations issued reports outlining their conclusions, each recommended that discounting in one form or another be adopted.

- In 1984, the National Association of Insurance Commissioners (or "NAIC") appointed a Task Force Study Group to develop a statement on loss reserve discounting. That Study Group recommended that the NAIC refrain from adopting a position that promotes discounting. However, the Study Group also recommended that the NAIC require disclosure of discounting practices and their impact on financial statements. The Study Group recommended several specific changes in the Annual Statement to provide for this disclosure.

- The NAIC did in fact adopt changes in the Annual Statement for 1985 designed to increase disclosure of practices and amounts of discounting.

- In 1984, the SEC adopted new disclosure requirements regarding the loss reserves of publicly held property/casualty insurers. The disclosures are designed "to assist investors in understanding and evaluating companies' reserving practices and the effect on reported income of adjustments to reserves." Specific disclosure is required as to the amounts and effect of discounting.

Current Practices in the U.S.

In workers' compensation, the statistical reporting plans of the National Council on Compensation Insurance (or "NCCI") and the various state bureaus involved in pricing that product line require the reporting of life pension case reserves on a discounted basis, usually at 5.5 percent or 5 percent rate. It is a common, but not universal, practice to report reserves in the Annual Statement on that same basis.

In addition to workers' compensation life pension cases, many carriers use a similar approach in establishing reserves for claims that arise from long-term disability health insurance policies.

As previously noted, the NAIC Task Force Study Group presented in 1984 a report that analyzed current practices and made several recommendations about discounting. It was the position of the study group that discounting of property/casualty loss reserves should not be encouraged by the NAIC. However, on the subject of
workers' compensation life pension reserves, the study group saw no purpose in prohibiting companies from the use of discounted reserves for these cases in the Annual Statement.

In their report, the Study Group also presented the results of a survey of the position of Insurers Commissioners of the 50 states about loss reserve discounting. Of the 52 responses received, 13 permitted discounting in some circumstances, either by statute, rule, or informal policy. Illinois, Michigan, New York, and Pennsylvania indicated that in addition to workers' compensation, discounting had been allowed in the medical malpractice line.

The new SEC rules for property/casualty loss reserves require disclosure of the amounts of discounting GAAP loss reserves, as well as the lines of business that are being discounted. In the disclosures for 1984, a variety of discounting practices and amounts was revealed. Many of the reporting companies indicated either that they did not discount or that the amounts of such discount were immaterial. However, 10 companies reported discounting practices that reduced their total GAAP reserves by more than two percent. One of those 10 companies disclosed that the effect of their discounting practice was to reduce their reserve by more than 13 percent. In addition to workers' compensation, three companies stated that they discounted reserves in the medical malpractice line at interest rates ranging from seven percent to eight percent.

The use of discounted reserves appears to be increasing, particularly in medical malpractice. In that line the claim settlement pattern is very long, and as a result it is fairly common to recognize investment income in the pricing of the product. Much of the medical malpractice insurance that is sold today is provided by specialty companies, many of whom are owned by or affiliated with state medical societies and state hospital associations. If many of these companies were required to establish reserves on a full value undiscounted basis, their surplus would be severely depleted.

In addition to explicit formal discounting of property/casualty loss reserves, many industry analysts believe that a great deal of discounting is taking place by other means. First and foremost is the practice of implicit discounting by the use of optimistic assumptions in the establishment of the reserves. These same industry analysts have suggested that this practice is so widespread that it is becoming

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2. Note that the SEC rules for disclosure apply only to publicly traded companies. Roughly 50 companies were required to disclose in 1984.
virtually institutionalized and may contribute to an overall reserve inadequacy generally estimated at 15 percent.

Discounting is also being accomplished by transferring loss re-
serve obligations between insurers. These transactions take two
principal forms. The first involves portfolio reinsurance of an en-
tire block of business between property/casualty insurers. In the process,
the assumed reserves are often converted from an undiscounted basis
to a discounted basis. Much, but not all, of this reinsurance is trans-
acted with offshore reinsurers, where discounting is an accepted
practice. While new regulations, such as those promulgated in New
York, have caused these contracts to involve an increasing amount
of real risk transfer, portfolio reinsurance activity does not appear to
have declined in 1985.

The second method is the practice of funding structured settle-
ments by the purchase of an annuity from a life insurance company
or entering into a trust agreement with a bank. This approach is used
not only in the settlement of liability suits, but also to shift workers’
compensation life pension cases from property/casualty insurance
companies to life insurance companies (thereby effecting an increase
in the discount rate from roughly 3 percent to 8 percent or more).

Many of these latter activities are inefficient (in the economic
sense) because they involve transaction costs without generating an
economic benefit to the insurance company. Typically, these re-
insurance treaties are designed more to achieve a desired accounting
effect than to achieve real risk transfer. However, it is clear that in
response to market pressures companies are engaging in these activi-
ties on a relatively large-scale basis. The offshore market of portfolio
reinsurance may involve an estimated transfer of $2 billion in loss
reserves annually.

In summary, the clear implication is that, regardless of whether
discounting is allowed by regulation, the market is forcing the dis-
counting of reserves on a de facto basis.

Current International Practices

Discounting of loss reserves is not yet a standard practice interna-
tionally, but it is common in a number of countries and, as in the
United States, there is a growing acceptance of discounting concepts.

Canada. In Canada, companies generally do not discount their
loss reserves. However, claim payment patterns are somewhat
shorter than in the United States, and some lines such as workers' compensation are not written. There are no regulatory prohibitions against discounting in Canada.

Recently, the Canadian Institute of Actuaries issued a series of recommendations for the financial reporting of property/casualty companies in Canada. These guidelines indicate that, while reserves are not customarily discounted, they may be discounted in financial statements if sufficient provision for adverse deviation has otherwise been included in the reserve.

**United Kingdom.** In the United Kingdom, the regulatory body is the Department of Trade and Industry (or "DTI"). It will accept discounting of loss reserves if the basis on which the reserves are calculated is clearly spelled out. It also considers the relevance of the interest rate. In accepting discounting, the DTI has indicated that discounting of loss reserves is preferable to implicit discounting or discounting through portfolio reinsurance, both of which are much more difficult, to monitor. The DTI takes into account whether the loss reserves are discounted when it monitors the overall solvency position of the company. DTI has not laid down specific limits as to what is a reasonable rate of interest.

Lloyd's largely discourages discounted reserves. However, many Lloyd's syndicates take so-called "time and distance" policies. These effectively provide a discounted reserve and are accepted by the Lloyd's market and Lloyd's committee for reserving purposes. One of the arguments used by both to justify this approach is that the discount rate is effectively determined by the market and not by the underlying syndicate.

**Other Countries.** Currently, discounting is discouraged in much of Continental Europe and the Republic of Ireland, although this is partly a result of much shorter claim payment patterns. In Bermuda, which generally follows British or Canadian accounting practices, discounting is permitted by regulatory authorities and is widely employed. In Australia, the use of discounted reserves has been standard since the mid-1970s. Australian reserving practices are generally more explicit regarding the inclusion of future inflation. Risk margins are provided by the use of conservative discount rates or through explicit loadings based upon confidence interval analysis.
Section II

Principal Arguments of Opponents of Discounting

Opponents of discounting raise a number of objections and concerns. Their principal arguments are enumerated below.

Discounting recognizes investment income before it is actually earned. Many opponents view the discounting of loss reserves as advance recognition of future investment income. They feel that the recognition of the investment income should wait until it is actually due to the insurance company.

Industry reserves are already weak, allowing the discounting of reserves will only serve to further weaken the industry’s reserve position. As has been noted already, many industry observers believe reserves to be inadequate; estimates place this inadequacy in the neighborhood of 15 percent. Many attribute the weakness of the industry’s reserves to the unwillingness of company managers to recognize and report unfavorable operating results. According to this view, movement to the use of discounted reserves is driven by a desire to further obscure the already unacceptable financial results of the industry.

The goal of Statutory Accounting is to assure financial strength. Perhaps, the strongest argument relative to the use of undiscounted reserves is that put forth by the regulatory community in the context of statutory accounting. These arguments center on the point that statutory accounting is intentionally conservative, in keeping with the regulatory goal of protecting the interests of policyholders.

The NAIC’s position regarding the underlying premise of statutory accounting is both long standing and well established. It was forcefully espoused in a major study conducted by the NAIC in 1970, entitled Measurement of Profitability and Treatment of Investment Income in Property and Liability Insurance. In a section dealing with regulatory goals, that study states:

First and most important is solvency. But more is needed than to just seek to assure solvency in the technical sense of excess of assets over liabilities or the ability to pay debts as they mature. Instead.

what is sought is an assurance that solvency will continue long enough in the future for any dangerous development to be detected and preventive measures applied. This more stringent concept goes by the term "solidity."

The conflict between the statutory approach and GAAP is a conflict between objectives rather than a conflict between "right" and "wrong." The statutory objective is to enhance the protection of the policyholder by ensuring that the companies have sufficient assets to meet the claims of the policyholders and to provide a sufficient margin of safety. . . . The emphasis is on solvency as shown by a balance sheet which is essentially prepared on a liquidating basis. . . .

The statutory approach attaches little significance to the operating statement of profit and loss in that the latter is regarded chiefly as a "bridge" between the amounts of statutory surplus available between two different dates. This balance sheet emphasis on liquidity results in changes to operations which tend to distort the actual, economic gains or losses arising from operations. . . . This is not regarded as a problem from a regulatory point of view. [Emphasis added.]

Many regulators believe that undiscounted reserves include an appropriate degree of conservatism, which is necessary to assure solvency. While this conservatism may not coincide with economic reality, it is considered appropriate for statutory financial reporting.

Discounting introduces complexity and breaks with tradition. All parties to the debate recognize that the use of discounted loss reserves will introduce an additional layer of complexity to the financial reporting process. Many opponents suggest that these changes represent a major change that will not be fully understood by the users of the financial statements; traditional measures and tests of performance will lose their meaning, creating new uncertainty that is unnecessary.

Further, the use of discounted reserves will increase the difficulty in a reserve setting process that already includes a substantial degree of uncertainty; in addition to estimating the amounts of ultimate liabilities, it will be necessary to estimate the timing of those obligations.
Principal Arguments of Proponents of Discounting

The proponents of discounting raise an equally strong series of arguments. Their key arguments are presented below.

Discounted reserves are closer to economic reality. It is well established economic and financial theory that a dollar today is worth more than the promise to receive a dollar at some point in the future. Equally true is the converse situation: the promise to pay a dollar at some point in the future represents less cost than the payment of a dollar today.

Proponents of discounting argue that loss reserves, which are obligations to pay amounts in the future, should be recorded in a manner that reflects the above economic relationship. To do otherwise only serves to distort financial statements by recording liabilities at a level that does not accord with economic reality.

Reserves should be estimated conservatively, but undiscounted reserves are overly conservative. There is general agreement that loss reserves should be established conservatively. Most (but not all) participants agree that a reasonable degree of conservatism is necessary due to the inherent uncertainties associated with loss reserves.

The proponents of discounting, however, would argue that full value loss reserves are overly conservative in an economic environment where interest rates are in the vicinity of 9 percent. They agree that historically the use of undiscounted reserves may have provided a reasonable degree of conservatism. However, that historical margin was predicated on an interest rate in the range of three percent to five percent. Under this view, the discounting of loss reserves at a conservative interest rate (perhaps in the 4 percent to 7 percent range) would still produce a reserve provision with a sufficient degree of conservatism.

Rates are now discounted in many lines. The requirement that reserves not be discounted produces distorted financial results. Rates for many of the long-tail lines include either an explicit or implicit recognition of anticipated investment income on the insurance cash flow. In these circumstances the use of undiscounted reserves produces a distorted financial picture. In the year the policy is written an underwriting loss is incurred. However, in subsequent
years the investment income on the policy will more than offset this underwriting loss.

Proponents argue that this is a mismatch between revenue and expense because the company is forced to recognize all of its losses before it recognizes all of the associated revenue. They argue that discounting would provide a better match, thereby providing a more accurate picture of financial performance and, ultimately, better information for decisions.

In addition to the distortion in operating income produced by the policy, there is a surplus drain that accompanies the underwriting loss. The underwriting loss must be funded from the company’s surplus account, not to be released until the investment income emerges and claims are paid. This puts constant pressure on surplus, especially during periods of growth.

Thus, it is argued that the use of undiscounted reserves also serves to understate the company’s (and the industry’s) true capacity, by unnecessarily tying up surplus in the loss reserve account.

Reserves are being discounted, either explicitly or by other indirect means. It would be better to recognize this reality explicitly. Proponents of discounting argue that the variation in reserving practice from one company to another, coupled with the use of portfolio reinsurance and other means of discounting, has made the evaluation of reported financial results exceedingly difficult. In addition, comparisons between companies are fraught with pitfalls.

In addition, it is argued that companies are engaged in activities that achieve the effects of discounting because the market dictates that reserves be discounted. Some of these activities, such as portfolio reinsurance and the funding of structured settlements through the purchase of annuities, involve a real economic cost to the company. Thus, it is argued, a prohibition on explicit discounting creates some economic inefficiency, as companies are forced to accomplish a necessary objective (discounting) by indirect means.

Section III

Income Statement Issues

Insurance company operating income is derived from three sources:

- Underwriting income (equal to premiums, less losses and expenses).
• Investment income on invested surplus.
• Investment income on the cash flow provided by the insurance operation.

Traditionally, industry results have been published with the latter two items combined. As has been noted, the historical view has been that the last item was not a major contributor to overall operating income.

Traditionally the industry’s performance has been measured by underwriting results with the combined ratio being a convenient barometer. Since products were priced without regard to investment income, it was appropriate to monitor the success of the industry by that standard.

As an earlier section pointed out, investment income from the insurance cash flow now contributes significantly to the total operating income of the industry, currently contributing roughly 12 percent of premium to the industry’s income. In these circumstances it is reasonable to question the continued use of the combined ratio as a measure of performance.

It is worth noting that problems associated with the use of the combined ratio as a performance standard are exacerbated by the presence of very different cash flow characteristics between different lines of insurance. Since different lines have different claim payout patterns, the investment income potential obviously varies significantly by line.

To demonstrate the importance of the differences in cash flow by line of insurance, the chart below presents the estimated combined ratios that would be equivalent to a total profit margin (pre-tax) equal to 5 percent of premium for various lines of property/casualty insurance.

<table>
<thead>
<tr>
<th>Line of Insurance</th>
<th>Combined Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Physical Damage</td>
<td>98%</td>
</tr>
<tr>
<td>Multi peril</td>
<td>106%</td>
</tr>
<tr>
<td>Auto Liability</td>
<td>110%</td>
</tr>
<tr>
<td>Workers’ Compensation</td>
<td>121%</td>
</tr>
<tr>
<td>General Liability</td>
<td>129%</td>
</tr>
<tr>
<td>Medical Malpractice</td>
<td>151%</td>
</tr>
</tbody>
</table>

These figures were calculated using industry claim payment patterns and a 9 percent interest rate.³

³ Note that it is not suggested that a 5% total profit margin is either adequate or inadequate for any line, nor is it suggested that profit margins should be the same
These figures illustrate that by relying on traditional published combined ratios, management, regulators, and security analysts may find it difficult to reach accurate conclusions. For example:

- Comparability between companies is not possible directly, without adjusting for differing mixes of business written by line. For example, a company writing commercial lines business predominated by workers' compensation and general liability may be more profitable than a combined ratio of 113 percent than a writer of personal lines with a combined ratio of 105 percent.

- Decisions by management to expand or contract writings, or to raise or lower prices, in a particular line may be based on a false premise as to the true profitability of that line. Capacity may be shifting away from the so-called "long-tail" lines in favor of the lines with faster claim settlement periods when in fact the true profitability may be greater on the former business.

Although sophisticated analyst can make adjustments for these shortcomings of the combined ratio, it would clearly be better to have a more direct measure of true profitability of the business written in each line and for each company as a whole.

To study the effects on reserve of discounting on financial results, a model of a single insurance company was constructed. One conclusion illustrated by the model is that the discounting of loss reserves can be used to realign total operating income into the following two components:

- Insurance income.
- Investment income.

The former component includes in addition to underwriting income a credit for the time value of the funds generated from underwriting. This credit is achieved by the discounting of the loss reserves. The amount of the credit is determined by the actual timing of the payments and the assumed discount rate. While the results developed in the Appendix are somewhat theoretical, there appears to be no practical obstacle to their implementation.

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4. See Appendix.
5. The Appendix examples also make clear that the choice of the reserving basis (discounted v. undiscounted) serves only to determine the rate at which the true
Effectively, the use of discounted reserves would restore meaning to underwriting results and combined ratios by including in them the recognition of the time value of money. Both measures would be stated on a discounted rather than a nominal value basis. In today's economic environment this result would produce a more meaningful picture of underwriting performance.

Presentation of underwriting results on a discounted basis would recognize that realistically many of the long-tail lines are profitable only after considering the time value of money.

The chart below, taken from the Appendix, summarizes the income on a single hypothetical insurance policy. In each case the assumptions as to the timing and amounts of premiums and losses on the policy are the same. The only assumption that is allowed to vary is the rate at which reserves are discounted.

<table>
<thead>
<tr>
<th>Reserve Discount Rate</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9%</td>
<td>14.41</td>
<td>1.30</td>
<td>1.41</td>
<td>1.54</td>
<td>18.66</td>
</tr>
<tr>
<td>7%</td>
<td>10.00</td>
<td>2.53</td>
<td>2.87</td>
<td>3.26</td>
<td>18.66</td>
</tr>
<tr>
<td>5%</td>
<td>5.25</td>
<td>3.93</td>
<td>4.45</td>
<td>5.04</td>
<td>18.66</td>
</tr>
<tr>
<td>0%</td>
<td>-8.37</td>
<td>8.25</td>
<td>8.99</td>
<td>9.80</td>
<td>18.66</td>
</tr>
</tbody>
</table>

As can be seen, the total cumulative profits are identical on the hypothetical policy regardless of reserving basis.

This example illustrates a major reason for the controversy over discounting. It demonstrates that if products are priced on a total return basis, and the product includes a significant investment income element, the use of undiscounted reserves generates an initial underwriting loss on the policy. In subsequent years, as the investment income on the policy accrues and claims are paid, the loss on the policy is converted to a profit.

Thus, the use of undiscounted reserves does generate a mismatch between revenue and expense because companies are forced to recognize all of the claims on a policy price to recognizing a significant portion of the associated revenue. In contrast, the use of economic profits associated with an insurance policy are released to earnings and not the true level of earnings itself.
Actuarial Reserving and Financial Regulation

discounted reserves provides a gradual recognition of the claim liabilities, in step with the recognition of all of the revenue associated with the policy. This approach provides a more accurate picture of the underlying economic situation and would result in more appropriate information for decision-making by users of the financial statements.

By recognizing both revenue and expenses gradually, the use of discounted reserves allows the true profits on the policy to emerge gradually over its life span. The degree of conservatism in the reserves, introduced either implicitly by the use of a conservative interest rate or explicitly by a margin in the estimated liabilities, or both, determines the rate at which profits emerge.

Profits on property/casualty insurance policies should not be released to earnings until there is a reasonable certainty of their attainment. This principle applies equally to underwriting income as well as investment income. While discounting provides a better match of revenue and expense, the discount rate, the assumptions as to ultimate losses, or both, should be chosen conservatively so as not to release profits prematurely. Premature release of profits can lead to overstatement of surplus, overextension of a company's resources, overpayment of income taxes, and ultimately to insolvency.

A final point on income recognition relates to the argument by opponents that discounting takes credit currently for investment income that will be earned in the future. The argument is not well constructed for two related reasons:

Reserves do not earn interest. The underlying assets supporting the reserves may earn interest, but the reserves themselves do not earn interest. Reserves can, however, be discounted to recognize the time value of money. This is a subtle but important distinction that needs to be better understood by all participants in the debate over discounting.

Because bonds are carried at amortized cost, insurance companies are currently allowed to recognize investment income before it is "received." Whenever a bond is purchased at a discount from its par value, insurance companies are allowed to take into income a portion of that discount each year that they own the bond. This income is not actually received until the bond matures, and is redeemed for its par value.

This point can best be illustrated by considering the case of so called "zero-coupon bonds." These bonds pay no interest over their
life. On these bonds, which are sold at a substantial discount from their par value, the only investment income recognized each year by the insurance company is the amortization of the discount. No cash income is received on the bond until its sale or maturity.

Thus it can be seen that discounting of any liability only recognizes the economic reality than the cost of any obligation in its present (discounted) value. This is because the full obligation can be funded by a deposit of the present value in a bank or other risk free account.

An insurance company's assets are valued based on the present value of the proceeds from those assets. Stating the liabilities on the same basis provides for an accurate statement of income and not the premature recognition of income.

**Balance Sheet Issues**

The need for a margin of conservatism in the setting of loss reserves is well established in both regulatory and actuarial literature. This need stems from the uncertainties associated with the estimation of these liabilities. The greater the uncertainties, the greater is the need for conservatism.

This principle is succinctly summarized in the American Academy of Actuaries' recent exposure draft of *Interpretation 8–8*, which discusses the standards by which the adequacy of loss reserves should be measured:

In evaluating reserves, consideration should be given to the insurer's responsibilities to policyholders and claimants as well as the inherent variability of conditions affecting future claim payments. Such consideration will often result in the judgment that reserves should be estimated on a conservative basis. In such cases the degree of conservatism is a matter of actuarial judgment and depends upon the actuary's confidence in the reserve estimate. Estimates may be conservative due to the actuary's selection of methodology and assumptions, or by including an explicit provision for adverse development.

The need for risk margins is not simply a reflection of an underlying "conservative nature" of actuaries or regulators. Rather, this need is a requirement that stems fundamentally from the nature of uncertainty. In fact, by using risk theory it can be proved that a company which charges prices based on expected costs without a
risk margin or profit provision will eventually fail, regardless of how much original surplus is assumed. Since prices must include this risk margin it is reasonable to retain all or some portion of this margin in the loss reserves.

As it pointed out in the Appendix, the central issue in the choice of reserve basis (discounted versus undiscounted) is the degree of conservatism desired in the presentation of the company's financial condition. At issue is whether or not the current system of undiscounted reserves is overly conservative.

Historically loss reserves have been established at expected ultimate levels on an undiscounted basis. This has provided an implicit risk margin represented by the time value of money.

As the length of time to pay all claims has increased and the level of interest rates has risen, the size of the implicit margin has increased substantially. Although the risks associated with the loss reserves have increased because of the extension of the claim payment period, it is not at all obvious that the increase in the implicit risk margin that results from the continued use of undiscounted reserves is necessary to support the increase in risk. Historically, implicit margins were generated by interest rates in the three percent to four percent range. Today, with interest rates in the vicinity of nine percent, the margins resulting from the use of undiscounted reserves are substantially larger.

The degree of conservatism in loss reserves that regulatory authorities require under statutory accounting is ultimately a matter of public policy. As noted earlier, statutory accounting is primarily concerned with the objective of assuring solvency.

However, the choice of conservative standard has a real economic cost associated with it. This extra cost occurs because an appropriate return must be earned on the extra capital tied up in the reserves (as measured by the difference between their full value and their discounted value). This extra return is in addition to the return which must be generated for the required visible statutory capital.

The extra return required on the capital tied up in the reserve margin must be provided for in the prices charged insurance consumers. Insurance companies will either obtain the higher prices necessary to provide these returns or withdraw from the market.

Because insurers find it necessary to enter into unprofitable transaction to release this capital suggests strongly that the market will not support the required returns on the hidden capital required by full-value reserves. By entering into these
arrangements insurers are reacting to competitive pressures that must be recognized.

As has been noted, many observers believe that the industry's loss reserves are already implicitly discounted, by an estimated 15 percent. This discounting is accomplished by the use of optimistic assumptions in the reserve setting process. Obviously, it would not be appropriate for reserves that are implicitly discounted to explicitly be discounted also. Any explicit discount must first replace the existing implicit discount.

**Practical Issues**

The discounting of loss reserves does introduce an additional layer of complexity to the reserve setting process. In addition to estimating the amount of future loss payments, the timing of those payments must be estimated.

For most companies and in most lines of insurance, historical data necessary to estimate the timing of loss payments is readily available. This data is already utilized by many companies in pricing of their products. Paid-loss data is also readily available by line and accident year in Schedules O and P of the Annual Statement. In those instances where data is not available, discounting may not be appropriate.

The mechanics of discounting while somewhat complex do not present an insurmountable obstacle. Knowledge and expertise in this area is increasing, as the concepts gain usage and acceptance by preparers and users of financial statements. Discounting is successfully employed in life insurance and in pensions, as well as other noninsurance instances.

Were discounting adopted on a wide scale, changes in the Annual Statement to accommodate this change would be appropriate. Several changes have already been made to accommodate the disclosure of discounting practices. Schedule P now provides for the conversion of reserves from a full-value to a discounted basis. Additional changes might be desirable in the future, although these changes could be evolutionary as experience in a discounted environment matures.

**Conclusions**

The traditional standard that loss reserves be established at their full undiscounted value was intended to achieve a margin of conserva-
tism in the presentation of financial results. The need for conservatism is well established, stemming from the regulatory objective of assuring solvency.

But in the circumstances that exist in today's market, the regulatory balance between the solvency objective inherent in the full-value reserve standard and other regulatory objectives relating to prices and markets needs to be reexamined.

The use of undiscounted reserves provides an implicit margin of conservatism, equal to the time value of the future cash flow associated with it. Historically, this margin has been modest. Under current economic conditions, if the standard of full value reserves were strictly adhered to, the size of the implicit margin would be substantial.

This margin has a cost associated with it, a cost that occurs because an appropriate return must be earned on the capital tied up in the reserve margin. The cost of any selected margin of conservatism (due to the higher prices that must be charged to provide the return on it) must be balanced by the benefits obtained from it.

A margin of conservatism in the loss reserves is appropriate from both an actuarial and a regulatory viewpoint. However, the current activities of the industry in the areas of portfolio reinsurance, external funding of structured settlements, and implicit discounting suggest that the competitive market will not support the cost of the margin inherent in full-value reserves.

Moreover, the size of the required margin has implications for the capacity of the industry. The standard of full value reserves produces a substantial margin of conservatism that is not available as surplus to support additional writings. A less stringent standard would release a portion of this margin to surplus, increasing capacity.

Discounted loss reserves, with an appropriate degree of conservatism, provide sufficiently for the associated liabilities. Conservatism can be introduced by the use of a conservative discount rate, by the use of conservative assumptions as to the timing and amount of future loss payments, or by some combination of these elements. The level of conservatism required is dependent on the degree of confidence in the reserve estimate.

Finally, the use of discounted reserves permits restructuring the presentation of income so that the time value of money is recognized in measuring the profitability and performance of individual lines of insurance. This restructuring would improve the matching of reve-
use and expense, and provide more meaningful information to users of financial statements.

Over the last 10 years significant changes in the structure and economics of the property/casualty industry have taken place. The standards of performance and control for the industry, including the standard of full-value reserves, were established prior to these changes. The continued adherence to the standard of full-value reserves diminishes the usefulness of financial statements, distorts information for management decision making, creates additional upward pressure on prices, lowers capacity, and forces insurers to engage in uneconomic activities designed to circumvent the standard. Under the circumstances consideration should be given to the use of discounted, rather than full-value, reserves in the financial statement presentation of property/casualty insurers.

APPENDIX

This appendix has been prepared to illustrate some of the concepts and mechanics associated with discounting. The illustration is by a simple example of a hypothetical insurance company that writes only a single policy. The company's financial results are analyzed under a variety of assumptions as to the basis of its loss reserves (discounted versus undiscounted). Situations are also considered in which the hypothetical company experiences adverse loss development or an earlier than anticipated loss payment. In total, nine different cases have been analyzed. These nine cases are presented in Exhibits 1 through 9. The effects of discounting on the balance sheet are relatively easy to conceptualize: loss reserves go down, and surplus goes up. However, the effects of discounting on the income statement are more complex. Over time the effect of discounting must be gradually removed (amortized) as the time of the loss payments gets closer. Accordingly, Exhibits 1 through 9 are oriented towards the income statement. However, balance sheet entries are included where necessary to show the derivation of the income entries. This approach was chosen not to diminish the relative importance of the balance sheet issues but rather to give emphasis to the more difficult income statement concepts.

The hypothetical company is assumed to operate as follows:

• The company has an initial surplus of $500,000, which is fully invested.

• The company writes a single policy for a premium of $91.67.

• Three years later, a loss of $100,000 is paid.

• There are no expenses.
The interest rate is 9%; all available funds are invested at that rate.

The building of the premium and investment income! and the payment of the loss take place on December 31 of the appropriate year.

There are no taxes.

The operating results of the company are presented over the four year life of the policy. In each case that was considered, one or more assumptions were altered, and the impact of that change on the company's results was noted.

In Case 1 through 5, the assumptions listed above are held constant, and only the basis of the loss reserve varies.

Case 1: Reserves are established on an undiscounted basis, at the full value of the estimated liability.

Case 2: Reserves are discounted at 9%, the level of the prevailing interest rate.

Case 3: Reserves are discounted at 7%, a somewhat conservative rate.

Case 4: Reserves are discounted at 5%, a more conservative rate.

Case 5: Reserves are discounted at 7%, but also include an explicit margin of conservatism in the estimation of the losses.

In Cases 6 through 9, the effect of adverse loss development or a change in the timing of the loss payment is considered. In Cases 6 and 7 the ultimate loss turns out to be $150.00, rather than the estimate of $100.00. In Case 8, the $100.00 loss is paid a year earlier than expected. Finally, in Case 9, the company experiences both adverse loss development and an earlier than expected payment.

The Underlying Economics

Prior to reviewing each of these cases, it is worthwhile to review and clarify the underlying economics of our hypothetical company's situation.6 The company writes the policy in "year 1," and pays the $100.00 loss three years later, in "year 4." If interest rates are 9% during the entire period, then the present value of the loss at the time the policy is written is:

\[ $100.00 \times (1.09)^{-3} = $77.22 \]

This means that the company can fund the loss by investing $77.22 at the

6. The reader may find it helpful, in reviewing this and the subsequent discussions, to recognize that conceptually, if underwriting risk is ignored, the company can be thought of as a savings and loan account, into which funds are deposited and out of which funds are withdrawn. The initial balance in the company is $100.00; that balance, along with the premium deposit of $101.63, will accumulate at interest each year until the loss is paid in year 4.
time the policy is written. Three years later when the loss payment is due, the $77.22 will have grown through compound interest to the required $100.00.

The company’s economic gain from writing the policy is equal to the premium, less the cost of the loss:

$91.63 - $77.22 = $14.41

This is the true economic gain on the policy. Regardless of whether this income is recognized immediately or gradually and regardless of whether it is recognized as underwriting income or investment income, the company has made a true economic profit of $14.41 by writing the policy (assuming of course that the investment rate and the timing and amount of the loss remain fixed).

The $14.41 is the profit in year 1 at the time the policy is written. If that profit is not paid out immediately, it, along with the original surplus of the company, will accumulate each year at the 9% interest rate. At year 4, when the loss is paid, the accumulated profit from the policy is:

$14.41 \times 1.09^4 = \$18.66

Case 1: The Current System- Undiscounted Reserves

On Exhibit 1, the results of the company are presented using the traditional approach of full value, undiscounted loss reserves. In year 1, the company collects the $91.63 premium, and establishes a loss reserve of $100.00. (Line 5a displays the estimated amount of the liability, line 5b displays the reserve established for that liability.) This produces an underwriting loss of $8.37, as shown on line 8. In subsequent years no underwriting profit or loss is generated by the policy.

In year 1 the company also earns $4.50 of investment income on its initial surplus. That investment income, plus the premium of $91.63 and the original surplus of $50.00, produces accumulated assets of $146.13 at the end of year 1. These assets are available for investment in year 2, where they earn $13.15 of investment income (line 9a). The process of accumulation continues in years 3 and 4, until the loss is finally paid. At the end of year 4, the company has accumulated assets of $89.24.

On lines 10a and 10b, the total income of the company is split into two key components. Line 10a displays the income that is attributable to interest on the company’s surplus. These figures exclude the investment income earned on the insurance policy. The $50.00 of surplus earns interest at a 9% rate each year. (The interest grows each year because of the compounding of interest on interest.)

On 10b, the balance of the income, attributable to the insurance policy, is displayed. Line 10b is a combination of the underwriting income on line
8, and the portion of the investment income that is attributable to the investment of the collected premium.

From line 10b, a major reason for the controversy over discounting can be observed. Due to the use of undiscounted reserves, the company reports a loss on the policy in year 1. This is the case despite the fact that the policy produces an overall profit.

At the end of year 1, the company's surplus, equal to its assets minus its liabilities, has gone down to $46.13, as shown on line 12.

In subsequent years, as the investment income on the policy accumulates, the loss on the policy is converted to a profit.

Case 2: Discounted Reserves

Exhibit 2 presents an alternative presentation of the financial results of the company; in this case reserves are discounted at the prevailing interest rate of 9%. As before, the premium collected in year 1 is $51.63. However, in this case the loss reserve that is established is $77.22, equal to the discounted value of the $100.00 liability.

In this case an underwriting profit of $144.11 is recognized in year 1. Note that this figure is exactly equal to the entire economic profit on the policy, described in an earlier section.

In subsequent years the loss reserve increases, as the period of discounting declines from three years to two years, and finally to one year.

As the discount is removed from the reserve, additional incurred losses arise that ultimately bring the total incurred losses to the level of the $100.00 payment. (Line 7a added across equals $100.00, rounding excluded.)

The additional losses incurred on line 7a are attributable to the "amortization of the discount," and therefore do not represent true loss development. On line 7a the effect of the discount is removed from the losses to produce net incurred losses on line 7c.

The discount removed from the losses on line 7b serves to improve the company's underwriting results. This improvement must be offset elsewhere in the income statement, lest total income be overstated. On line 9b the amortization of the discount has been deducted from gross investment income to obtain the company's net investment income on line 9c.

Referring to line 10b of Exhibit 2, it can be seen that due to the discounting of the loss reserves, the company no longer reports a loss on the policy in the first year. In contrast, the entire economic profit on the policy is reported in the first year. The profits on the policy in subsequent years represent the accumulation of interest on the $144.41 profit.

Cases 3 and 4: Alternative Interest Rates

Cases 3 and 4 parallel Case 2, except that interest rates below the 9% market rate are used to discount the loss reserves. In Case 3 the reserves are discounted at 7%, while in Case 4 a 5% discount rate is used.
<table>
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Table 5: Data Table

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<td>G</td>
<td>H</td>
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<td>J</td>
<td>K</td>
<td>L</td>
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<td>M</td>
<td>N</td>
<td>O</td>
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<tr>
<td>U</td>
<td>V</td>
<td>W</td>
<td>X</td>
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<tr>
<td>Y</td>
<td>Z</td>
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<td>Total</td>
</tr>
</tbody>
</table>

Journal of Insurance Regulation
### COMPARISON OF DISCOUNTING ALTERNATIVES

<table>
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<tr>
<th>Item</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
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<tbody>
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<td>1. Interest Rate</td>
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<td>9%</td>
<td>9%</td>
<td>9%</td>
<td>9%</td>
</tr>
<tr>
<td>2. Discount Rate</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
<td>7%</td>
</tr>
<tr>
<td>3. Beginning Assets</td>
<td>$10.00</td>
<td>$146.13</td>
<td>$159.29</td>
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<td>$173.62</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. Premium Income</td>
<td>$91.63</td>
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<td></td>
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<tr>
<td>5. Loss Reserve</td>
<td>$15.93</td>
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<td>6. Loss Payment</td>
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<td></td>
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<tr>
<td>7. Gross Insured Loss</td>
<td>$91.63</td>
<td>$5.71</td>
<td>$6.11</td>
<td>$6.54</td>
<td>$100.00</td>
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<td>8. Amount of Discount</td>
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<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
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<tr>
<td>9. Net Insured Loss</td>
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<td>$5.71</td>
<td>$6.11</td>
<td>$6.54</td>
<td>$100.00</td>
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<td>10. Net U/W Income</td>
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<td>$0.00</td>
<td>$10.00</td>
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### EXHIBIT 4

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<td>9%</td>
<td>9%</td>
<td>9%</td>
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<td>7%</td>
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<td>$159.29</td>
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<td></td>
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</tr>
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<td>4. Premium Income</td>
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<td>91.63</td>
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<tr>
<td>5. Loss Reserve</td>
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<td>$9.37</td>
<td>9.46</td>
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<tr>
<td>6. Loss Payment</td>
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<td>7. Gross Insured Loss</td>
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<td>$86.38</td>
<td>$4.32</td>
<td>$4.54</td>
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</table>
Note that the 7% case serves as the basis for the company's pricing. That is, the $91.63 premium was chosen such that at a conservative 7% interest rate an economic profit of exactly $10.00 is produced by the policy.

Comparing Cases 3 and 4 to Case 2, the following observations can be made:

- The choice of the discount rate determines the split of profits between underwriting and investment income.
- The use of a lower interest rate causes the profits on the policy to be recognized more slowly, however total profits are unaffected by the choice of the discount rate.

The latter point is key and deserves emphasis. The chart below summarizes the reported profit on the policy by year and in total under each of the four reserving bases [from line 10b of Exhibits 1–4].

### Profits From Hypothetical Insurance Policy

<table>
<thead>
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<th>Reserve Discount Rate</th>
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<th>Year 3</th>
<th>Year 4</th>
<th>Total</th>
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<tr>
<td>9%</td>
<td>14.41</td>
<td>1.30</td>
<td>1.41</td>
<td>1.54</td>
<td>18.66</td>
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<tr>
<td>7%</td>
<td>10.00</td>
<td>2.53</td>
<td>2.87</td>
<td>3.26</td>
<td>18.66</td>
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<tr>
<td>5%</td>
<td>5.25</td>
<td>3.03</td>
<td>4.45</td>
<td>5.04</td>
<td>18.66</td>
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<tr>
<td>0%</td>
<td>-8.37</td>
<td>8.25</td>
<td>8.99</td>
<td>9.80</td>
<td>18.66</td>
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</table>

As can be seen, the overall cumulative profits are identical regardless of the reserving basis. The choice of reserving basis serves only to determine the rate at which profits on the policy are released to earnings, and not the true level of earnings itself.

Thus the central issue in the choice of reserve basis is the degree of conservatism desired in the financial presentation; and the focus of the current controversy should be whether the current system of undiscounted reserves is overly conservative.7

An additional observation can be made by comparing the surplus at the end of each year under each of the four reserving basis [line 12 of Exhibits 1–4].

---

7. Note that the timing of the earnings would, in the real world, affect the timing of income tax payments. After-tax earnings would therefore be influenced by the choice of reserving basis, as tax payments would be accelerated by discounting and deferred by not discounting.
### Surplus Under Differing Reserving Bases

<table>
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<tr>
<th>Discount Rate</th>
<th>Beginning Surplus</th>
<th>Surplus at the End of Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>9%</td>
<td>50.00</td>
<td>68.91</td>
</tr>
<tr>
<td>7%</td>
<td>50.00</td>
<td>64.50</td>
</tr>
<tr>
<td>5%</td>
<td>50.00</td>
<td>59.75</td>
</tr>
<tr>
<td>0%</td>
<td>50.00</td>
<td>46.13</td>
</tr>
</tbody>
</table>

As pointed out earlier, in the undiscounted case surplus goes down in year 1 due to the underwriting loss that is sustained on the policy. This does not occur in any of the discounted cases. In each of those cases the rate of increase in the surplus is dependent on how quickly the profits on the policy are recognized. In the 9% discount case, where the full profit of $14.41 is recognized in year 1, surplus in years 2, 3, and 4 grows solely due to interest at the 9% rate. In the 7% and 5% cases, profits are released to surplus more slowly.

Note that under all four cases, surplus ends up at $89.24 at the end of year 4. The first of the two bullet points immediately above noted that the choice of the discount rate determines the split of profits between underwriting and investment income. This point also deserves some additional explanation. In the traditional approach presented in case 1, underwriting income is equal to premiums minus losses without regard to interest. In that case all investment income is treated as distinct from underwriting income.

In contrast, in case 3 the net underwriting income includes an investment income element. Specifically, line 8 reflects the total income on the policy under an assumed 7% interest rate. The balance of the investment income attributable to the spread between the actual rate of 9% and the assumed rate of 7%/remains in the investment income account on line 9.

The simplest way to conceptualize this change is to presume that the underwriting department is loaning the investment department the cash flow from the policy at a 7% interest rate. The underwriting income reflects the benefit of the 7% interest on that cash. Similarly, the investment department becomes a true banking operation whose results reflect its ability to invest at a rate higher than the rate it is paying.

As was noted earlier, the hypothetical policy was priced to produce a $10.00 economic return at a 7% interest rate. Using that same rate as the discount rate allows the true performance of the underwriting department to be measured by the underwriting results.

### Case 5: The Use of Explicit Conservatism

Historically, it has been the practice to set reserves on an undiscounted basis at the level of expected losses. Given that the degree of conservatism in the
### Exhibit 5
COMPARISON OF DISCOUNTING ALTERNATIVES
Case 5: Reserves Discounted at 7%—With Explicit Margin*

<table>
<thead>
<tr>
<th>Item</th>
<th>Calendar Year</th>
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</thead>
<tbody>
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<td></td>
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</tr>
<tr>
<td>1. Interest Rate</td>
<td>9%</td>
</tr>
<tr>
<td>2. Discount Rate</td>
<td>7%</td>
</tr>
<tr>
<td>3. Beginning Assets</td>
<td>50.00</td>
</tr>
<tr>
<td><strong>UNDERWRITING INCOME</strong></td>
<td>63.91</td>
</tr>
<tr>
<td>4. Premium Income</td>
<td>63.91</td>
</tr>
<tr>
<td>5a. Est. Loss Liability</td>
<td>107.50</td>
</tr>
<tr>
<td>5b. Loss Reserve</td>
<td>87.75</td>
</tr>
<tr>
<td>6. Loss Payment</td>
<td>100.00</td>
</tr>
<tr>
<td>7a. Gross Incurred Loss</td>
<td>87.75</td>
</tr>
<tr>
<td>7b. Amort. of Discount</td>
<td>0.00</td>
</tr>
<tr>
<td>7c. Net Incurred Loss</td>
<td>87.75</td>
</tr>
<tr>
<td>8. Net U.W. Income</td>
<td>3.84</td>
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<tr>
<td><strong>INVESTMENT INCOME</strong></td>
<td>6.50</td>
</tr>
<tr>
<td>9a. Gross Inv. Income</td>
<td>5.00</td>
</tr>
<tr>
<td>9b. Amort. of Discount</td>
<td>0.00</td>
</tr>
<tr>
<td>9c. Net Inv. Inc.</td>
<td>4.50</td>
</tr>
<tr>
<td><strong>TOTAL INCOME</strong></td>
<td>5.40</td>
</tr>
<tr>
<td>10a. From Original Surplus</td>
<td>3.88</td>
</tr>
<tr>
<td>11. Ending Assets</td>
<td>146.13</td>
</tr>
<tr>
<td>12. Ending Surplus</td>
<td>58.38</td>
</tr>
</tbody>
</table>

* Assumptions: 1) no adverse loss development (expected payment = true payment = 100) and 2) no change in timing of payment

reserve basis affects only the timing of the recognition of income, it might be appropriate to include in the reserves an explicit margin of conservatism. In other words, reserves could be established above the level of expected losses. This is, in fact, what is done in life insurance, where assumptions are intentionally selected on a conservative basis.*

8. The implementation of such a procedure for casualty companies would be more difficult since assumptions can not be easily categorized as to conservatism because of differences between companies' underwriting, pricing and claim handling practices.
Case 5 presents this alternative approach to the setting of loss reserves. In this case, reserves are discounted at 7%; however the initial estimate of losses is established with a 7.5% margin of conservatism, at $107.50. In subsequent years the margin is reduced to 5.0% and 2.5%, so the amount of the loss payment becomes increasingly certain. Case 5 can be thought of as a situation where the policy is priced at a conservative 7% interest rate, with a $2.50 profit provision and a $7.50 contingency provision.

Overall profits in Case 5 are again the same as in previous cases. However, this approach is different in that underwriting income is released gradually over the life of the policy rather than being recognized fully in the year the policy is written.

Cases 6 through 9: The Need for Conservative Reserves

As noted previously, traditional accounting practices require that loss reserves be set conservatively. Reserves are provisions for estimated liabilities such provisions, when calculated on an undiscounted basis, provide an implicit margin for reasonable adverse deviations from expected costs, since the recognition of income is delayed.

Looking at the conservatism issue from the income statement perspective, the objective is to release profits on the policy only to the extent that those profits are reasonably certain of attainment. Premature release of the profits on the policy can lead to overstated surplus, overexposure of the company's resources, overpayment of income taxes, and ultimately to insolvency.

Cases 1 through 5 demonstrated that the true economic profit from the insurance policy is determined by the amounts and timing of premiums and the losses and the level of the actual interest rate and were independent of reserves. In those cases, the amount and timing of the loss and the level of the interest rate were fixed.

In reality, loss amounts, timing of loss payments, and interest rates are subject to variation of actual from expected amounts. Cases 6 through 9 explore the effect of loss variation on the emergence of the profits on the policy. The influence of variation in interest rates on profits can be reduced by choosing an appropriate investment strategy. This latter issue is addressed in the examples.

Cases 6 and 7 consider the effect of adverse loss development. In both cases the initial expected loss is $100.00. However, in year 3 it was anticipated that the loss will be $102.50 and the actual payment in year 4 is $105.00. In Case 6, the explicit margin in the loss reserves is sufficient to absorb this.

---

9. The 7.5%, 5.0%, and 2.5% margins chosen are intended to be illustrative only.
<table>
<thead>
<tr>
<th>Item</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Interest Rate</td>
<td>2%</td>
<td>4%</td>
<td>6%</td>
<td>8%</td>
<td>12%</td>
</tr>
<tr>
<td>2. Discount Rate</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
<td>30%</td>
</tr>
<tr>
<td>3. Unemployment Benefits</td>
<td>3%</td>
<td>5%</td>
<td>7%</td>
<td>9%</td>
<td>11%</td>
</tr>
<tr>
<td>4. Medical Care Benefits</td>
<td>8%</td>
<td>12%</td>
<td>16%</td>
<td>20%</td>
<td>24%</td>
</tr>
<tr>
<td>5. Other Benefits</td>
<td>4%</td>
<td>6%</td>
<td>8%</td>
<td>10%</td>
<td>12%</td>
</tr>
<tr>
<td>6. Total Benefit</td>
<td>20%</td>
<td>32%</td>
<td>44%</td>
<td>56%</td>
<td>68%</td>
</tr>
</tbody>
</table>

Note: The table above represents various percentages for different categories. The 'Total' column sums up the percentages across the categories.
adverse deviation. While underwriting profits in year 3 and year 4 are eliminated, no underwriting loss is reported.

In Case 7, there is no explicit margin in the loss reserves. As a result, an underwriting loss is sustained in years 3 and 4.

In Cases 8 and 9, the loss payment occurs in year 3 rather than year 4. In Case 8 the payment is $100.00, while in Case 9 the payment is $105.00. In both cases, despite the explicit risk margin, an underwriting loss is sustained in year 3 due to the shortfall of anticipated investment income.

There is clearly a need for conservatism in measuring property/casualty insurance results. Cases 6 through 9 illustrate two types of risk (amount and timing) that are associated with each insurance policy. The discounting of loss reserves removes a portion of the implicit margin of conservatism that would otherwise have been present in the financial statement. Because of the risks associated with loss reserve liabilities, any discussion of discounting should include consideration of the levels of remaining reserve margins, provided either by the use of a conservative interest rate, or by explicit conservatism in the other actuarial assumptions, or both.
Predicting Troubled Insurers

Introduction


The hunt for troubled insurers grew more intense from the late 1980s through the mid-1990s. Despite the talent and tools put into the quest, regulators have made only modest gains in predictive accuracy. Like Willenborg, Anderson and Formisano take a practical approach to identifying characteristics of an insurer that are causally linked to insolvency.

Using six case studies, they identify operating characteristics more than financial ratios. Unlike other research that sought statistical relationships between insolvency and readily available financial data, the authors took an in-depth look at the published data combined with detailed interviews with company and regulatory personnel.

This paper was an early critique of IRIS. The authors warned that reported surplus drives seven of the P&C IRIS ratios. Thus, these IRIS ratios are faulty flawed unless one has confidence in the measure of surplus.

From hindsight, many of their findings strike today's reader as self-evident. However, at the time of their writing, they were focusing the attention of financial analysts: rapid premium growth and managing general agents were established as key culprits in insurer failure. Fraud and misapplication—contrary to popular wisdom—are relegated to the second rank causes.

They not only point to financial indicators of insolvency, but also offer regulatory responses. For example, given the importance
of rapid premium growth, they warn regulators to increase capital requirements for insurers that are rapidly expanding their marketing territories. They also stress the need for examiners to look for hazardous underwriting, rating and marketing systems in rapidly growing companies.

What factors best predict insurer insolvency? Anderson and Formisano offer clear answers based on post-mortems of actual insurer failures.
Causal Factors in Property-Liability Insolvency

Dan R. Anderson*  
Roger A. Formisano**

Abstract

The authors have collectively been involved in the analysis of six different insolvencies of property-liability insurers. They have noticed surprising similarities in the causal factors associated with these insolvencies. Because of the economic and regulatory significance of insurance company insolvencies, the authors feel that it would be useful to consolidate and analyze their findings.

Introduction

The purpose of the research is to obtain a better understanding of the various causal factors that are associated with insolvencies of

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** Professor of Risk Management & Insurance, University of Wisconsin-Madison.
property-liability ("P&L") insurance companies. Insurance company insolvencies have adverse economic effects on policyholders. Insolvencies impact other insurers through assessments to state guaranty funds. Insurer insolvencies have important regulatory implications—indeed one of the principal purposes of insurance regulation is to prevent insolvencies. Finally the convolutes of the causal factors of insolvencies provide positive guidance for the successful operation of an insurance company.

Recently the number of insurer insolvencies has been gaining increased significance. As can be seen in Figure 1, from 1969 through 1986, 140 insolvencies of property-liability insurers have occurred. Fifty-nine of these insolvencies (42 per cent) occurred in the last three years, 1984–1986. During the 15 year period 1969–1983, state guaranty fund assessments totaled $453,744,637. In just the last three

**FIGURE 1:**
Property-Liability Insurer Insolvencies
[1969–1986]

years, 1984-1986, assessments more than doubled to $350,809,372. These assessments do not include those associated with very recent insolvencies of some large insurers like Mission and Integrity, which are estimated to run into the hundreds of millions of dollars.

In an effort to reduce insurer insolvencies and their resulting adverse financial effects, various studies of the causal factors associated with insolvencies have been conducted, each having been somewhat limited in scope or findings. For instance, a study by the United States General Accounting Office (GAO) of a sample of insurer insolvencies in the period 1977-1986 provided excellent descriptive statistics but concluded that: "Analysis of the data did not reveal any characteristics or trends common to all companies; rather it showed they varied in size, scope of operations, and lines of insurance written." Harrington and Nelson provided insight on causal factors using regression-based methodology, but the sample was limited to 12 insurers that went insolvent in the period 1977-1981.

Treischmann and Pinches analyzed financially distressed insurers in the period 1966-1971 using discriminant analysis. While providing significant results, the profile of the typical insolvent insurer studied, i.e., a small automobile insurer operating in one state or on a regional basis, is quite different from more recent insurer insolvencies. Eck applied a closely related procedure on a study of

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2. The assessment figures do not include assessments made under pre-assessment funds in New York and New Jersey; nor do they include payments made by the individual companies under the guaranty provision of the Uniform Motorist endorsement.
4. Id. at 16.
7. In their study, a firm in financial distress is defined as one that entered into liquidation, receivership, conservatorship, or rehabilitation during the time period of the study (1969-1979).
25 insurers that failed in the period 1969–1977. Interestingly, Eck selected his predictive variables on the premise that failure is often the result of dishonesty, basing his premise on a previous study of 26 insolvent insurers domiciled in Illinois where he found dishonesty was involved in at least 21 [81 per cent] of those insolvencies.\textsuperscript{9} Saltmänn\textsuperscript{10} and Smith and Bar-Niv\textsuperscript{11} have applied more sophisticated guidelines and models to assess and predict insolvencies.

Wencik\textsuperscript{12} studied the insolvency problem and condensed causal factors to a single common denominator—poor management. Others have suggested general techniques for identifying causal factors associated with insolvencies.\textsuperscript{13}

In general past research efforts have been characterized as providing pieces to the puzzle of what causal factors are associated with P&L insurer insolvencies. The authors feel that their current research also contributes a piece to the puzzle. The next section will examine specific common causal factors studied by the authors. The final section will present conclusions and discuss implications of the research.

Methodology

The methodology for this paper is basically the case study approach. The authors have been involved in the analyses of six different in-

\textsuperscript{10} Saltmänn, R.J.S. Denmark to Identify Financial Weakness, 68 Proc. of the CAS. ACTUARIAL SOCY (1981).
\textsuperscript{13} Anderson, Insolvency of Wisconsin Safety Corporation, Wisconsin Insurance Commissioner’s Report (Business of 1976), BEAKON, How to Check Your Insurer’s Solvency: Executives Suggest Keep In Touch, RISK MANAGEMENT (April 1983), BEAKON, id (June, 1985), Dieringer, Insurer’s Solvency Determining Which Companies Can Survive the Storm, id. [June 1984].
surer insolvencies. These six insurers are: The Wisconsin Surety Corporation, All Star Insurance Company, Reserve Insurance Company, Martell Insurance Company, Reliable Insurance Company, and Eastern Indemnity Corporation of Maryland. Table 1 provides some basic summary data on these insurers. Primarily these analyses were conducted for either state insurance commissioners or guaranty funds. Two of these analyses resulted in publications. The others are still in the process.

In their analyses, the authors gathered data and information from two general sources. The first source consisted of various published financial statements, annual statement blanks, state examination reports, articles of incorporation, company files, board minutes, and other written information. The second source consisted of interviews with individuals familiar with the particular insolvency, including former employees, state regulators, liquidators, competitors, and others with pertinent information. The interviews were all conducted under a condition of anonymity, i.e., specific statements and opinions would not be attributed to specific individuals.

The authors feel that the above process provides a unique understanding of the causal factors associated with insurer insolvencies. Previous research efforts have typically relied on published data available from such sources as the A.M. Best Company or general compilations of information. The authors' study took an in-depth

<table>
<thead>
<tr>
<th>Insurer</th>
<th>Commenced Operation</th>
<th>Declared Insolvent</th>
<th>Premiums (000)</th>
<th>Assets (000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin Surety</td>
<td>1965</td>
<td>1975</td>
<td>$ 946</td>
<td>$ 2,300</td>
</tr>
<tr>
<td>All-Star</td>
<td>1961</td>
<td>1977</td>
<td>6,878</td>
<td>13,000</td>
</tr>
<tr>
<td>Reserve</td>
<td>1919</td>
<td>1979</td>
<td>98,000</td>
<td>156,000</td>
</tr>
<tr>
<td>Martell</td>
<td>1878</td>
<td>1980</td>
<td>704</td>
<td>323</td>
</tr>
<tr>
<td>Reliable</td>
<td>1962</td>
<td>1981</td>
<td>47,000</td>
<td>75,000</td>
</tr>
<tr>
<td>Eastern Indemnity</td>
<td>1979</td>
<td>1985</td>
<td>6,000</td>
<td>11,000</td>
</tr>
</tbody>
</table>

examination of six specific insolvencies by analyzing published data and other written information and by conducting specific detailed interviews. During the analysis of these six insurer insolvencies, the authors noticed that a number of common causal factors existed. Indeed although the business was heterogeneous, surprising similarities were found among the causal factors for these insolvencies. These consistent findings precipitated the idea for this paper.

In the presentation of these common causal factors, the authors are somewhat restricted in their ability to identify factors with specific companies. Some of the information is privileged because of pending and current litigation involving some of the insurers. Therefore, in the discussion of the common causal factors, emphasis will be on a collective profile of the insolvent insurers, although individual company data will be presented when appropriate.

Common Causal Factors

This section will present causal factors common to the six insurer insolvencies. As noted above, emphasis will be on developing a collective profile of the insolvent insurer. Inclusion of a factor does not necessarily mean that it was observed in all six insurers, only that this factor tended to be significant for the group as a whole.

Rapid Growth or “Management by Premium Volume”

Rapid growth was one of the most significant variables associated with the insurers which went insolvent. For instance, net written premiums for Wisconsin Security Corporation increased nearly five-fold in a four-year period from 1968 ($101,000) to 1972 ($909,000). American Reserve Corporation (Reserve’s parent) net premiums written increased nearly three-fold in the six-year period from 1967 ($33,061,947) to 1973 ($91,009,857). From 1975 to 1979 Reliable Investors Corporation (Reliable’s parent) revenues increased from $5,027,000 to $32,053,000, over a six-fold increase. In the five-year period 1968-1973, All-Star’s net written premium grew nearly 10 times, from $1.2 million to $11.2 million. Table 2 compares the annual premium growth rates of these insurers with the overall property-liability industry growth rates for these time periods.
TABLE 2

<table>
<thead>
<tr>
<th>Insurer/Year</th>
<th>Insolvent Insurer</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin Surety '68-'72</td>
<td>47.6%</td>
<td>10.9%</td>
</tr>
<tr>
<td>Reserve '67-'73</td>
<td>11.4</td>
<td>10.1</td>
</tr>
<tr>
<td>Reliable '75-'79</td>
<td>89.6</td>
<td>16.1</td>
</tr>
<tr>
<td>All-Star '68-'71</td>
<td>56.3</td>
<td>10.3</td>
</tr>
</tbody>
</table>

Rapid growth does not in itself necessarily produce adverse financial results, but if mistakes are made, they become compounded by that growth. In addition, if these mistakes go undetected for an extended period, the situation becomes potentially more dangerous.

The rules of insurance statutory accounting can act to slow rapid growth. From a statutory accounting standpoint a surplus drain is created by the accounting process by which premium income must be incurred, while expenses are recognized when paid. Even the best run companies need adequate surplus to finance premium growth. As a result of the limitations which statutory accounting rules place on growth, some of the insurers studied frequently reacted by adjusting statutory rules, i.e., by adjusting unearned premium and reserves, to "create" surplus to support growth.

Rapid growth should always be a signal to interested parties [i.e., regulators, investors, management] to ask what is producing this growth. Particularly if the competition is growing at a slower pace. If the reasons are superior management and marketing skills or better products, there should be little concern. On the other hand, if growth is being stimulated by premiums which are below cost or by poor underwriting, immediate concern should be registered.

Expansion to Other States

Rapid premium growth was frequently accompanied by expansion of business to other states. Wisconsin Surety expanded from writing business in two states in 1968 to 13 states in 1974. From 1975 to
1979, the number of states in which Reliable was licensed to do business expanded from 10 to 32. Eastern Indemnity expanded from one state in 1979 to 54 by 1984. All-Star Insurance Company not only expanded to other states, it also ventured into foreign reinsurance markets to achieve growth.

Expansion to other states is not necessarily detrimental, but it must be done in a controlled fashion. The authors observed that expansion was frequently without adequate control of agents, underwriting, and/or claims management. In addition, adequate resources were often not present among the insolvent insurers. For instance, Wisconsin Surety was writing insurance in 13 states, but its annual premium volume never exceeded $1,000,000.

It appears that once an insurer gains a license in the state in which it is domiciled, it is fairly easy to gain licenses as a foreign insurer in other states. The states in which the insurer is applying for a license as a foreign insurer seem to rely heavily on the state of domicile. Although exceptions existed, most states followed this rule and provided easy entry.

Inadequate Pricing

With most products in our economic system, costs are determined prior to the sale or generation of revenues. Pricing of these products is determined by adding a competitive profit margin to costs, with obvious attention given to market prices. It would be foolhardy to sell the product below cost, except in emergency short-run situations. Such a strategy would guarantee the bankruptcies of the firm.

With insurance products, the timing of costs and revenues are reversed. That is, the revenues in the form of premiums are received first, while the primary costs of insurance are determined in the future as claims are paid. If future claims are not estimated properly in determining current premiums, it is possible that the insurance product is being sold below cost.

The pricing of insurance is an inexact science. Perfectly good premium estimates can be rendered inadequate if conditions change and cause claims to increase. Whether the insurance policy has been adequately priced can generally be determined only after all future claims are paid.

It is not surprising that inadequate pricing would be a key factor in insurance company insolvencies studied by the authors. These
insurers concentrated in lines of insurance which historically are difficult to price because of claims variability. In particular, lines included surety, excess and surplus lines, and nursing home insurance.

If policies are concentrated in highly variable lines and premiums are increasing rapidly, the monitoring of the pricing system becomes extremely important. As claims begin to be paid on these policies, it is critical that they be carefully monitored and compared to the premiums that have been charged to make sure that the premiums are adequate. The importance of a proper monitoring system becomes even more critical as premium growth is rapid. Obviously, a rational insurance organization would want policies to be adequately priced before selling an increasing volume of such policies.

Inadequate Loss Reserves

The loss reserving process is closely connected to a system of adequate pricing. Loss reserves are basically the dollar value of estimated future claims. Loss reserves along with paid losses and expenses must be compared with premiums charged for a particular group of insurance policies. If loss reserves are underestimated, it may lead to a false sense of security in the adequacy of pricing system.

Again in the case of the insolvent insurers studied here, the presence of highly variable insurance experience and increasing premium volume put more pressure on the maintenance of a proper system of monitoring loss reserves. As with pricing, establishing loss reserves is an inexact science. Once set, loss reserves must be monitored and tested. If loss reserves have been originally underestimated, the longer it takes to discover the problem, the greater the delay in making adjustments to the pricing system. Appropriate attention must be given to the analysis of loss reserve development.

Inadequate loss reserves also distort the insurer’s surplus position. Surplus is overstated to the extent that loss reserves are inadequate. Using measures like premium to surplus ratios, the insurer is able and permitted by regulations to write more premiums than it should. If this situation is coupled with inadequately priced insurance and an emphasis on rapid growth, a fatal sequence is established. The example in Table 3 portrays how this might happen.
TABLE 3
Effects of Rapid Growth
When Surplus Is Misstated

<table>
<thead>
<tr>
<th></th>
<th>End of Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Reported</strong></td>
<td></td>
</tr>
<tr>
<td>Premiums</td>
<td>1</td>
</tr>
<tr>
<td>Misstated Surplus</td>
<td>1</td>
</tr>
<tr>
<td><strong>Actual</strong></td>
<td></td>
</tr>
<tr>
<td>Premiums</td>
<td>2</td>
</tr>
<tr>
<td>Adjusted Correct Surplus*</td>
<td>1</td>
</tr>
</tbody>
</table>

* Assumes no actual profits made hence no additions to surplus.

Inadequate loss reserves were a common characteristic of the insolvent insurers. As mentioned above, inadequate loss reserves lead to delays in adjusting premiums. In some cases by the time loss reserves were adjusted, the size of the adjustment exceeded the company’s capital and/or surplus account, i.e., the adjustment forced the company into insolvency.

The importance of the relationship between pricing and loss reserving cannot be overstated. In one case, an insurer booked 100 per cent of premiums as loss reserves, believing they could not be underreserves. Unfortunately, premiums were not adequate and thus reserves were understated.

The importance of loss reserves in insolvent situations is underscored by the fact that in two of the cases “big eight” accounting firms are being sued by insurance commissioners or guaranty funds or both for issuing unqualified certified opinions of the insurers prior to insolvencies. In both these cases, a key accusation is that the accounting firms did not evaluate properly loss reserves.

**Lack of Proper Underwriting**

The underwriting function is an integral part of any well-run insurance company. The function basically involves the selection process by which the insurance company screens and classifies its prospective policyholders. Proper underwriting will normally result in the insurer acquiring a representative group of policyholders. Under-
writing techniques protect the company against adverse selection
where a disproportionate number of poor risks are accepted by
the insurer.

In an insurance operation a working tension normally exists be-
tween the underwriting department and the sales or production de-
partment. The sales department and agents are usually most con-
cerned with writing the business regardless of whether the risks are
good or bad. As commission rates increase (as was the characteristic
of many of the insolvent insurers), agents will have even more in-
centive to write business, indiscriminately. The underwriting de-
partment is interested in writing business, but also it is interested
in getting a proper distribution of good and bad risks.

Management may be tempted to side with the sales department.
The insurance business can give the deceptive appearance of profi-
TABLE, particularly if only short-term results are considered. If man-
agement’s goals are stated in terms of premium income and paid
expenses and losses, while future claims are disregarded, short-run
positive cash flow and profits (and possibly stock prices) can have a
magnifying, even an addictive, effect. It may lead management to
give its “underwriting pea” to the agency force to augment premium
growth and cash flow. In many cases in the insurers studied the pro-
per separation of underwriting and pricing/production was not
maintained. Unfortunately, if unprofitable business is being put on
the books, the long-run “tail” will eventually catch up as future
claims develop and are paid.

In general there was a breakdown in the underwriting process
within the insurers studied by the authors. The companies were
dominated by the sales departments. Sometimes underwriting de-
cisions were overruled by top management. In some cases the pres-
ident came up through the ranks and therefore was biased by a pro-
duction orientation. Often there was a tremendous pressure to put
business on the books (again the rapid growth syndrome), but little
concern with the quality of that business.

Over-Concentration of Business

In a number of the insolvency cases, there was an over concentra-
tion of business within a single line of insurance. For instance, Wis-
conse Surety and Eastern Indemnity wrote predominantly surety business,
most of it in the form of contract bonds. Reliable Insurance Com-
pany concentrated its business heavily in the Medicare supplement and missing home insurance markets. Marvell had a different type of concentration. A town mutual, it had a territorial concentration that made it extremely vulnerable to a serious localized tornado or storm.

Following their studies, the authors have a new appreciation for the advantages of a multiple line portfolio of business. Although heavy concentration is not inherently a poor business practice, problems can exist if the particular book or business goes bad. Closely related in importance is expertise in the lines an insurer writes. Typically, most insurance companies write a more varied mix of policies than those companies studied by the authors. This mix allows for adverse developments in one line of insurance to be balanced by favorable developments in other lines. When an insurer concentrates in only one line of insurance it must do so with expertise. If the line goes bad, this balancing effect is lost. If an insurer does choose to concentrate its business, underwriting becomes even more critical. Concentration with weak underwriting and complicated by rapid growth can, as the authors found, be a fatal combination.

Claims Management

While claims management was not a critical factor in the insolvencies, it often complicated a troublesome situation. In some cases the claims department was paying too much for claims and was making payments when the company was not liable under the contract. In other instances, the claims department was resisting unreasonably or denying claims and ending up with higher claims and fines in the long run. Finally developments and trends in claims are an important input to the loss reserving process. Frequent breakdown among insurers helped contribute to erroneous loss reserves.

Reinsurance

Reinsurance helps an insurer to avoid catastrophic losses. It can also lessen surplus drains or temporarily augment surplus through surplus relief reinsurance treaties. An improper reinsurance portfolio could expose the primary company to unnecessary losses. Inadequate reinsurance was a definite factor in the insolvency of at least one insurer, Marvell Mutual. Marvell was particularly vulnerable to inadequacies in its reinsurance program because it was a
Predicting Troubled Insurers

mutual with all its business concentrated within a limited geographical area. In other insolvencies, the reinsurance portfolio was excellent. Indeed in at least one case, the reinsurers actually had greater losses than the primary carrier. Wisconsin Surety had to stop paying claims when it ran out of money, but its reinsurers were forced to keep paying legitimate claims.

General Management

As would be expected, the actions of top management and the boards of directors played a critical role in all the insolvencies. The most common situation was characterized by a strong dominating president along with a relatively complacent board of directors. This situation was often accompanied by handpicked by the president personnel who tended to be “yes” men and women. Strong, dominating corporate presidents are certainly not unusual, but when they make decisions contrary to fundamental insurance principles, problems develop. The responsibility then shifts to the board of directors. In a number of the insolvent insurers, the board was unwilling or unable to pull in the reins on an aggressive president.

Exogenous Factors

Exogenous factors—those beyond the control of the management—can cause problems even in the best run companies. In this study, the solvent insurers were adversely affected by a series of external factors, including changes in the economy (e.g., construction, health care utilization rates poor weather), and social and legal patterns [e.g., tort liability system]. Of course, insurance companies are in the business of dealing with such risks. Even when conditions cannot be anticipated or controlled, insurers should be able to either absorb the consequences with adequate surplus and reinsurance, or to monitor these conditions and react with appropriate changes.

Conclusions and Implications

The handling of insurance company insolvencies is a perplexing one. In most industries, business failures are a natural and necessary condition of a healthy and efficient market. In most industries, the cas-
omer is not hurt by a bankruptcy, e.g., a customer can shop at a different store, eat at a different restaurant, etc. But because of the adverse financial consequences on policyholders and on their insurers through guaranty fund assessments, it becomes prudent to try to understand and prevent insurer insolvencies.

In this analysis of six different P&L insurer insolventcies, the authors observed a series of common causal factors associated with these insolvencies. These common causal factors have been discussed in the main body of the paper. The authors feel that the results of this study can be used by regulators to more efficiently control insurance company insolvencies. While some of the causal factors—for example, underwriting, loss reserving and claims management—may be more difficult to monitor, others like premium growth and expansion to other states can be readily supervised. Accordingly, the following recommendations are made:

The authors feel that regulators should more adequately control the premium growth variable. For the insurers studied, rapid premium growth greatly complicated the adverse conditions brought about by poor underwriting practices, inadequate pricing, deficient loss reserving and poor claims management. In addition, rapid growth—absent product innovation (rare in the insurance industry) or mergers/acquisitions—can realistically only be accomplished by pricing below cost and taking an unreasonable proportion of poor risks.

The authors recommend giving the highest priority to monitoring and regulating an annual premium growth limit. The IRIS standard of more than 34 per cent growth in net premiums written could be used as a starting point. If an insurer exceeds this limit, it should assume the burden of proof of demonstrating to state insurance regulators that this excessive growth is for the right reasons and is under control. Meeting this burden would include demonstrating that proper underwriting, pricing, loss reserving and claims management practices are in force. The current IRIS test for growth is not effective because the insurer must fail at least three additional (four total) tests of the 11 financial ratio tests before it is classified as a "priority company" for regulatory scrutiny.

Related to the premium growth test, the authors recommend that regulators monitor more closely expansion to other states. In general, regulators in non-domicile states should be more careful about issuing licenses to foreign insurers. The authors recommend
that insurers that desire to expand to other states meet increased capital and surplus standards. In addition, before expansion is permitted, these insurers should demonstrate adequate resources and controls for agents, underwriting practices and claims management.

After examining the six insolvent insurers, the authors feel that the current IRIS tests of 11 financial ratio ranges needs improvement. Seven of the financial ratios involve policyholders’ surplus. For a number of the insurers studied, surplus position was substantially overstated because of underreserving. The IRIS tests work well if one has confidence that the policyholders’ surplus figure is solid. But if surplus is understated, then the IRIS tests can give very misleading results. In this study, this inadequacy was particularly apparent in the “premium to surplus” ratio tests. Even though many of the insurers were growing out of control, their “premium to surplus” ratios looked normal due to overstated surplus.

Even though the results of this study cannot be generalized beyond six insurers analyzed, the commonality of the causal factors associated with these insolven-cies was so strong as to suggest that these factors may frequently be present in other insolvencies. The authors suggest that researchers be alerted to these factors and include measures for these factors in future studies.

Regulators should find the results of this study useful in their efforts to prevent and monitor insolvencies. Finally, the converse of the causal factors of insolvencies can provide positive guidance for the successful operation of a P&L insurer.
Introduction


The high incidence of property-casualty insurance insolvencies in the 1990s, along with Congressional criticism of state solvency regulation, stimulated the NAIC’s “Solvency Policing Agenda” of the early 1990s and the advent of risk-based capital requirements. The underlying premise of the new regulatory efforts is that capital requirements and solvency monitoring should consider those risks that endanger an insurer’s financial strength and those factors that foretell an increased probability of future insolvency.

Predictive Power

Political pressures—that is to say, the need for the NAIC to show that it was dealing speedily with the insolvency problem—led to the rapid development of the risk-based capital requirements. In contrast, the actuarial community has consistently argued that the effectiveness, or the “discriminatory power,” of the risk-based capital formula must be evaluated before the formula is implemented. In other words, does the risk-based capital formula, for all its complexity, help regulators differentiate between those insurers that are likely to fail and those insurers that will remain solvent?

The relationship of complexity to predictive power is crucial. The State of Texas, for instance, has proposed a risk-based capital formula based on three simple leverage ratios. It has argued that this formula’s predictive power—that is to say, its ability to foretell future financial distress—is comparable to that of the NAIC formula. Similarly, the American Academy of Actuaries task force on risk-based capital has recommended the elimination of several compo-
nents of the risk-based capital formula on the grounds that they add little discriminatory power to the formula.¹

Data problems and resource constraints prevented the NAIC research team from testing the effectiveness of the risk-based capital formula. The same limitations have impeded actuaries from testing the predictive power of the various components of the formula. The result is the implementation of a highly sophisticated formula, under the imprimatur of the NAIC, with little knowledge of how well the formula actually "works."

Insurance researchers, however, both in academia and in the industry, have examined this question, though the studies have been limited and sporadic. A dozen or two published papers have asked: "What factors best predict insurer insolvency?"¹

These studies examine a host of factors. Efficient research requires a compilation of these studies, so that future analysts can build upon prior results. Michael Willenborg's IFR paper, "Financial Statement Analysis in the Property/Casualty Insurance Industry," serves this purpose admirably. He surveys the existing literature to unearth the factors that may have predictive power for future insurer insolvency.

This survey is particularly important for Appointed Actuaries, who may soon have to report on insurance companies' financial strength under a variety of future financial conditions (as recommended by the American Academy of Actuaries), so this paper has now been added to the CAS Part 10 examination syllabus. If the role of the Appointed Actuary is indeed expanded as envisioned by the American Academy, both regulators and casualty actuaries will return to Willenborg's paper and to the studies which he reviews to discern which factors are useful indicators of future financial distress.

Willenborg's paper is inclusive, not judgmental. Willenborg reports the published studies, he does not judge the soundness of the results which he surveys. Some readers may fault him for this; after all, several of the papers which he reviews use dubious statistical techniques or limited and low-quality data. Such criticism would be

¹ For instance, the task force recommended eliminating the underwriting risk charge on unearned premiums, as well as the bond use factor and the asset concentration factor. The NAIC accepted the first of these recommendations, but not the latter two.
misplaced. Judgments on the validity of the existing research, an
arduous task that would clutter up Willenborg's paper, can come
only after a survey of what the existing research indicates.

Predictor Variables and the Risk-Based
Capital Formula

The basic practical question raised by Michael Willenborg's survey
is "To what extent do insurance department solvency monitoring
procedures use efficient predictor variables?" We might rephrase this
question as, "Are the new risk-based capital requirements reasonable
in light of the existing research regarding predictor variables of fi-
nancial distress?"

How should the reader approach this question? That is, how
should the reader use Willenborg's analysis to judge the effectiveness
of a solvency monitoring system? When analyzing a solvency mon-
itoring formula, the reader should place each component into one of
three categories:

• Components of the formula that focus on the predictor vari-
ables identified by Willenborg and others and which efficiently
predict future financial distress or discourage insurers from en-
gaging in overly-risky behavior.

• Components that are lacking in the formula. For instance,
some predictor variables are too complex to be incorporated in
a generic formula.

• Components of the formula that are likely to increase the in-
cidence of insolvency by encouraging more risky behavior.

As an illustration, let us consider some of the actuarial contribu-
tions to the NAIC's risk-based capital formula, using the approach out-
lined above.

The first exposure draft of the NAIC's risk-based capital formula
did not consider the company's growth rate. Willenborg notes that
rapidly growing companies are more likely to face financial distress,
and several actuarial studies have replicated this finding. Accord-
ingly, the NAIC implemented the recommendation of the American
Academy of Actuaries (AAA) task force on risk-based capital that the
RBC formula impose additional reserving risk and written premium.
risk charges for companies with annual growth rates in excess of 10 percent.

The NAIC risk-based capital formula has a flat 10 percent "credit risk" charge for all reinsurance receivables. As Willenborg notes, an effective predictor variable must consider the quality of the reinsurer as well as the characteristics of the reinsurance program. Accordingly, the AAA task force on risk-based capital recommended that the charge for reinsurance recoverables vary with the quality of the reinsurer and perhaps also with the attributes of the reinsurance program. Unfortunately, differentiating by type of reinsurance program is too complex for a generic (regulatory) formula, and distinguishing between "high" and "low" quality reinsurers invites opposition from segments of the reinsurance industry.

Several components of the risk-based capital formula may have the untoward effect of increasing the insolvency risk of property-casualty insurers. The most heralded example is the reserving risk charge, which bases the capital requirements on the held reserves reported by the company. The effect is a triple incentive for companies in financial distress to weaken their loss reserves, as the actuary Stephen Lowe has pointed out:

- Weakening the loss reserves increases the reported policyholders' surplus, thereby raising the ratio of actual surplus to "required" surplus.
- Weakening the loss reserves reduces the reserving risk charge and with it the capital requirements, thereby raising the ratio of actual surplus to "required" surplus.
- Weakening the loss reserves lowers the company's average adverse loss development, thereby reducing the capital requirements and raising the ratio of actual surplus to "required" surplus.

Michael Willenborg and other researchers are exploring the predictive power of numerous insurer characteristics. Meanwhile, the NAIC and various rating agencies (such as the A. M. Best Company) have developed risk-based capital formulas. These formulas are far from perfect: some components are indeed properly used, but others are lacking or have unwanted effects. Both the insurance industry and the public will benefit if readers of this volume can use the studies surveyed by Willenborg to improve the solvency monitoring systems needed by regulatory officials.
In Search of Candidate Predictor Variables: Financial Statement Analysis in the Property/Casualty Insurance Industry

Michael Willenborg

Abstract

In this article, the author attempts to provide a set of meaningful predictor and analytic variables to promote future efforts to conduct both solvency surveillance and financial statement analyses of property/casualty insurance companies.

Introduction

Concern about the financial condition of the property/casualty insurance industry is growing. Since 1984, 225 property/casualty insurers have been involuntarily dissolved or placed under supervision.

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8 Thanks are extended to KPMG Peat Marwick, specifically the National Industry Support and Audit Research Group based in the firm’s Executive Office in Montvale, New Jersey.

* Ph.D. Candidate (Accounting), Pennsylvania State University.
compared with only 89 in the previous seven-year period (i.e., 1977–1983). The goal of predicting insurer insolvency has proved to be an elusive one. A 1987 United States General Accounting Office ("GAO") study stated that "analysis of selected data on 95 property/casualty insurance companies that were liquidated in the 10-year period from 1977 through 1986 did not reveal any characteristics or trends common to all companies." Several reasons for insurer insolvency have been advanced, including inadequate pricing arising from improper underwriting, an inability to forecast costs accurately, a rising cost curve driven by the shift in tort laws favoring claimants, the fact that liability insurance is subject to catastrophic loss similar to the configuration problems typical to the early fire insurance business, an increasing volatility in the book of business maintained by a property/casualty insurer, cash-flow underwriting practices, and fraud and dishonesty.

**FIGURE 1**
Involuntary Corporate Retirements

![Graph showing involuntary corporate retirements from 1980 to 1993.]

Source: A.M. Best Company

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In certain respects, it could be argued that previous attempts at property/casualty insurance company solvency surveillance have been impeded by the absence of an extensive search for effective candidate predictor variables that would promote developing models to discriminate between distressed and non-distressed insurers.

In an effort to facilitate future efforts at solvency surveillance and analytical review, this paper documents the primary findings of a review of the literature and presents these findings within the context of an overall framework for financial statement analysis. The scope of the review of the literature was designed to cover many vantage points of financial statements of property/casualty insurers. It included academic publications, business press reports, corporate annual reports, governmental studies, insurance industry organization studies, professional accounting/auditing literature, and security analyst reports. The broad categories presented here are not intended to represent an empirically-based framework for analyzing the financial statements of a property/casualty insurer, but rather an a priori approach based on the author's informed intuition.

Categories of Candidate Predictor Variables

The following broad categories of candidate predictor variables are advanced as a general framework for analyzing the financial statements of a property/casualty insurance company:

1. Asset management.
2. Dishonest or fraudulent management.
4. Leverage, liquidity, and capital adequacy/structure.
5. Loss reserve development and adequacy.
6. Profitability, underwriting results, and operational efficiency.
7. Reinsurance activities.
8. Underwriting and sales practices.
9. Other.
Asset Management

Asset Quality and Diversification

The financial condition of a property/casualty insurance company can be affected adversely by specific investment problems, by a general failure to diversify properly its portfolio, or both. A study on insurer insolvency by Stewart Economics identified asset catastrophes, in addition to fraud, liability catastrophes, and bad management, as a principal cause of insurer insolvency. Accordingly, the extent to which the insurer has funds invested in such potentially troublesome areas as real estate loans or low quality bonds should be assessed by the analyst.

The analyst should compare and analyze measures of investment quality and asset diversification. In a study of industry solvency surveillance, Pinches and Trischmann found the ratio of book value of stocks to market value of stocks to be an effective discriminator between distressed and non-distressed insurers within the context of a statistical model. Harrington and Nelson used the ratio of market value of stocks to total assets as an independent variable in a regression model designed to estimate an insurer’s premium-to-surplus ratio in an attempt to control for investment mix differences across firms.

Asset/Liability Management:

In addition to exposure to insurance-related risks, a property/casualty insurer is, of course, also exposed to financial-related risks. Historically, property/casualty insurers have paid little attention to the nature of insurance liabilities when investing. Traditionally, they have placed investment funds in long-term bonds and common

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stocks without regard to the predominately short-term nature of property/casualty liabilities. This failure to match investment maturities with cash flow needs has exposed many insurers to substantial interest rate risk. A report on insurance company solvency by the Congressional Research Service ("CSR") estimated the average maturity of a property/casualty insurer's bond portfolio to be 10.2 years. This relatively long-term investment position contrasts sharply to a loss reserve liability duration of 2.5 years, as estimated in a report issued by Morgan Stanley on property/casualty insurance company asset/liability management.

Investment Results

The effect of both investment income and capital gains on the financial condition of a property/casualty insurer is also of primary importance. Security analysts will typically follow a company's investment income performance closely. In addition, the National Association of Insurance Commissioners ("NAIC") has consistently emphasized the importance of investment results by including an investment-yield measure among the 11 ratios in its Insurance Regulatory Information System ("IRIS").

Level of Invested Funds

Security analysts and company management also typically analyze the level of invested funds in relation to a property/casualty insurer's profitability, underwriting results, and the general level of interest rates. An insurer's level of investable funds can be approximated by adding unpaid losses, unpaid loss adjustment expenses, and unearned premiums, and then subtracting agent balances receivable and amounts recoverable as reinsurace on paid losses and also deferred policy acquisition costs if using financial statements based upon Generally Accepted Accounting Principals ("GAAP").

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8 NAIC, Insurance Regulatory Information System [1987-1990] [hereafter "NAIC"].
Dishonest, Fraudulent, or Incompetent Management

In a study of financially troubled insurance companies, Eck reported that generally failed property/casualty insurers are characterized by relatively high commissions, salaries, and stockholder dividends combined with relatively low underwriting expenditures, poor receivables management, and underwriting losses. Eck reasoned that 1) because most failures result from dishonest management and 2) the loss reserve is the most common vehicle used to conceal the true condition of a financially troubled insurer, it is unreasonable to develop a solvency surveillance system based heavily on loss reserves and surplus. He argued that a failure detection system should focus instead on the drain of financial resources. An insurer may manifest a drain of financial resources by delaying the payment of justified claims or as to conceal the payment of fraudulent claims or by removing company assets by means of excessive salaries, commissions, adjustment expenses, and dividends. Dishonest management can act to conceal these activities by understating loss reserves, or by increasing cash flow through aggressive sales practices, or by minimizing claims and underwriting expenditures. The specter of fraudulent activity can also affect adversely the liquidity of property/casualty insurance companies, for typically, reinsurers will withhold payments and banks will refuse to honor letters of credit when fraud or dishonesty is alleged.

Increased Risk in Book of Business and Line of Business Considerations

Trend Towards Liability Insurance

As a result of various, recent business developments, such as self-insurance and risk retention groups, the insurance industry has undergone a fundamental shift from traditional property-type coverages to liability-type coverages. Stew-

10. STEWART ECONOMICS, INC., Note 3 supra.
<table>
<thead>
<tr>
<th>Candidate Predictor Variable</th>
<th>Rationale/Explanation</th>
<th>Specific Source(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Mortgage loans on real estate to subtotal of cash and invested assets</td>
<td>This measure can be viewed as an indicator of possible exposure to real estate asset concentrations, particularly given the negative impact of real estate lending currently impacting the banking industry.</td>
<td>Wall Street Journal (March 23, 1990)</td>
</tr>
<tr>
<td>2 Mortgage loans on real estate of policyholders surplus</td>
<td>No specific rationale or source provided.</td>
<td></td>
</tr>
<tr>
<td>3 Mortgage loans on real estate plus real estate to total assets</td>
<td>Evans found this measure to be descriptive of substandard automobile insurers.</td>
<td>Evans (1968)</td>
</tr>
<tr>
<td>4 Low-quality, lower quality, or near default bonds to total assets</td>
<td>These measures can be viewed as indicators of potential exposure to real estate asset concentrations, because an insurer may have invested in speculative, high-risk or high-yield investments which were restricted for statutory purposes.</td>
<td>Best’s Review (January 1990)</td>
</tr>
<tr>
<td>5 Low-quality, lower quality, or near default bonds to policyholders surplus</td>
<td>No specific rationale or source provided.</td>
<td></td>
</tr>
<tr>
<td>6 Market value of bonds to book value of bonds</td>
<td>If this measure is less than 1.00, then policyholder’s surplus can be viewed as overstated, on a liquidation basis, by the amount which book value exceeds market value.</td>
<td>Insurance Review (November 1985)</td>
</tr>
<tr>
<td>7 Book value of assets to market value of stocks</td>
<td>Porches and Trinchera found this measure to be an effective discriminator between distressed and non-distressed insurers within the context of their statistical model.</td>
<td>Porches and Trinchera (1974)</td>
</tr>
</tbody>
</table>

*Note: The table represents a portion of the content from the Journal of Insurance Regulation.*
Predicting Troubled Insurers

<table>
<thead>
<tr>
<th>Level of Investigation</th>
<th>Investment Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Involuntary liquidation of assets</td>
</tr>
<tr>
<td>14</td>
<td>Insolvent receivership or liquidation</td>
</tr>
<tr>
<td>13</td>
<td>Bankruptcy (Chapter 11)</td>
</tr>
<tr>
<td>12</td>
<td>Bankruptcy (Chapter 7)</td>
</tr>
<tr>
<td>11</td>
<td>Change in directors one year after event</td>
</tr>
<tr>
<td>10</td>
<td>Cash and short-term securities</td>
</tr>
<tr>
<td>9</td>
<td>Market value stocks in liquidation</td>
</tr>
<tr>
<td>8</td>
<td>Market value stocks in voluntary liquidation</td>
</tr>
</tbody>
</table>

This table represents the relationship between the level of investigation and investment results in predicting troubled insurers.

Harrington and Noll used this measure, as an indicator of company's financial stability, as a regression model input. This measure can be viewed as an indication of both company's soundness and policy significance.
<table>
<thead>
<tr>
<th>Category</th>
<th>Candidate Predictor Variable</th>
<th>Rationale/Explanation</th>
<th>Specific Source(s) [if any]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improper diversion of company funds</td>
<td>Total salaries to total assets</td>
<td>This measure can be viewed as an indicator of the extent to which dishonest management can remove company assets by means of excessive salaries. Eck found this measure to be higher in failed firms for the periods two and three years prior to failure (for the year immediately preceding failure, nonfailed firms had a higher ratio).</td>
<td>Eck (1982)</td>
</tr>
<tr>
<td></td>
<td>Stockholder dividends to pretax net income</td>
<td>This measure can be viewed as an indicator of the extent to which dishonest management can remove company assets by means of excessive dividends. Eck found this measure to be higher in failed firms for the periods two and three years prior to failure (for the year immediately preceding failure, nonfailed firms had a higher ratio).</td>
<td>Eck (1982)</td>
</tr>
<tr>
<td></td>
<td>Commission expense to direct premiums written</td>
<td>This measure can be viewed as indicator of the percentage of premiums written which are paid to salespersons. A high ratio may be the result of an attempt to redirect funds to an affiliate agency. Eck found this measure to be higher for failed firms for all three years prior to failure studied.</td>
<td>Eck (1982)</td>
</tr>
</tbody>
</table>
Predicting Troubled Insurers

Economist cited the following factors as reasons why this shift in coverage types may lead to future larger-scale insolvencies:

- Insurer books of business have become increasingly volatile because of recent liability insurance shortages and increased competition.
- Liability insurance typically involves longer time lags, greater uncertainty, and the conflation of claims made previously associated with fire insurance.
- Tort law changes in favor of claimants have led to a rising cost curve and a resulting inability to forecast accurately costs, loss reserves, and prices for insurance coverage. [Note: Contrary evidence has recently been published in a study conducted by law professors at Cornell University.]

The analyst can attempt to measure this trend towards liability coverage by reviewing the year-to-year change in net premiums written for the lines of business previously captured on Schedule P as a percentage of total net premiums written.

Riskiness of Certain Lines of Business and Explosive Claims Areas

There is a widespread perception that certain lines of business have greater degrees of risk. A report on insurance failures by the GAO stated that 21 of the 49 insurers it studied that had failed between 1977 and 1986 wrote primarily automobile coverages. A solvency surveillance study of the property/liability insurance industry by Harrington and Nelson used measures of automobile, miscellaneous liability, and workers’ compensation business mix as independent variables in a regression equation designed to predict an insurer’s premiums-to-surplus ratio. The extent to which a company’s actual ratio deviated from its predicted ratio was found to be pow-

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erful indication of the company's solvency. Rapid expansion either into new lines of business or into new geographic areas can also indicate increased risk if an insurer does not possess sufficient experience or qualified personnel to underwrite and manage the new business or locations.

The recent rise in both explosive claim areas and mass tort situations has affected adversely insurer financial stability. These increases often result from liability claims that arose from coverages priced, written, and reserved many years before the emergence of current judicial trends about such issues as asbestos and workers' compensation. The CRS study cited the rise of financial guaranty insurance as a particularly destabilizing development in the industry, for, despite its resemblance to surety bonding, financial guaranty insurance is economically more like title insurance because of the underlying expectation of negligible losses. Typically premium income from writing such coverage funds the underwriting research that enables the insurer to exclude cases that have a significant probability of loss. The A. M. Best Company issues an NA-4 rating (rating procedure inapplicable) to companies that write financial guaranty insurance.

The market for surplus/excess lines insurance (that is, coverages that are unavailable from an insurer licensed in the applicant's state and therefore obtained in an out-of-state marketplace— including, risks of an unusual nature, substandard risks, risks with high loss potential, or risks requiring a special policy form that is unacceptable to state regulators) is considered particularly volatile and economically damaging because claimants are typically not covered by established guaranty funds in states where surplus lines insurers are not licensed. (Only New Jersey has a special fund for surplus lines.)

15. AICPA, Property and Liability Insurance Industry Developments, Update to the Industry Audit Guide [1989] (hereafter "AICPA").

16. Kappaper, Note 6 supra. The author reacted that the theory of risk being identified and excluded rather than that being transferred and absorbed is usually valid in the insurance industry. However, despite such apparently conservative underwriting, insurers that write financial guaranty business become potentially liable for enormous amounts. So even in the face of seemingly remote chances of loss, insurers should hold significant reserves. And unlike title insurance, financial guaranty insurance has probabilities of loss that are neither fixed nor statistically independent. If macroeconomic variables deteriorate significantly, widespread losses can materialize.
<table>
<thead>
<tr>
<th>Category</th>
<th>Candidate Predictive Variable</th>
<th>Business/Explanation</th>
<th>Specific Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trend: liability - instance</td>
<td>Old Schedule P types of business net premiums written divided net premiums written</td>
<td>maturing, maturing than others, otherwise being equal, the proportion of workers written in the long-rolled Schedule P plans is likely to be positively related to default risk over time with the greater possibility of large forecast errors as actual losses than in short-rolled plans. This measure is in the ratio of net premiums written for those lines of business previously reported on Schedule P (i.e., auto liability, homeowners liability, workers compensation, farm owners multiple peril, homeowners multiple peril, commercial multiple peril, auto primary, workers compensation, workers repetition). The measure represents the year-to-year shift of the liability-related composition of an insurer's book of business.</td>
<td></td>
</tr>
<tr>
<td>Risk of certain events of business and expense claims areas</td>
<td>Two-year loss ratio - workers' compensation</td>
<td>A. M. Renfro, based upon an analysis of post-1985 Reins Review (January 1995) insurance, accident, property, general liability, and medical malpractice at a current line of business. This measure represents the rate of incurred losses and the amount of excess expenses to net premiums earned over a two-year period for the workers compensation line of business.</td>
<td></td>
</tr>
</tbody>
</table>
5 Two year loss ratio - auto liability

A. M. Rees, based upon an analysis of gis/1963 Rej Review (January 1968)

6 Earthquake net

Rappaport observed that the industry is threatened by various macro stress situations and the overhang of claims from coverages priced, written and reserved for long terms (e.g. earthquakes and related fires, hurricanes). This measure can be viewed as an indicator of possible exposure to explosive claim area.

7 Financial guaranty net

This measure can be viewed as an indicator of possible exposure to explosive claim area.

8 Trend change - auto liability net

This measure can be viewed as an indicator of possible exposure to explosive claim area.

9 Trend change - financial guaranty net

This measure can be viewed as an indicator of possible exposure to explosive claim area.

10 Trend change - worker's compensation net

The ACIPA cited that rapid expansion in either new lines of business or new geographic areas may indicate increased risk if a company does not have sufficient experience or qualified personnel to underwrite and manage the new business [e.g. an insurer may not have developed sufficient data to establish premium rates or exposure to claims]. This measure can be viewed as an indicator of possible exposure to explosive claim areas. The analysis should expand the set of specific lines of business net premiums written trend change ratios as considered appropriate.

11 Trend change - financial guaranty net

12 Trend change - workers' compensation net

13 Trend change - medical malpractice net

14 Trend change - auto liability net

15 Trend change - financial guaranty net

16 Trend change - workers' compensation net

17 Trend change - medical malpractice net

18 Trend change - auto liability net

19 Trend change - financial guaranty net

20 Trend change - workers' compensation net

21 Trend change - medical malpractice net

22 Trend change - auto liability net

23 Trend change - financial guaranty net

24 Trend change - workers' compensation net

25 Trend change - medical malpractice net

26 Trend change - auto liability net

27 Trend change - financial guaranty net

28 Trend change - workers' compensation net

29 Trend change - medical malpractice net

30 Trend change - auto liability net

31 Trend change - financial guaranty net

32 Trend change - workers' compensation net

33 Trend change - medical malpractice net

34 Trend change - auto liability net
Leverage

The industry’s traditional measure of underwriting capacity is the net leverage ratio (net premiums written to statutory surplus), which relates the insurance risk assumed to the surplus available to absorb loss variations. In their study of insolvency prediction, Ambrose and Seward17 correlated a high net leverage ratio with insolvent firms, based on the reasoning that distressed insurers aggressively write new business to increase cash flow. Pinches and Trieschmann18 found the net leverage ratio to be the best individual predictor variable in a statistical approach for predicting financially troubled property/casualty insurers.

However, Harrington and Nelson19 argued that this ratio is of limited use, because the use of net premiums written assumes a comparable absolute impact on default risk for direct premiums and premiums for reinsurance assumed and ceded. The authors claim that anecdotal evidence about recent insolvencies suggest that this assumption may not be valid. Assumed reinsurance often will pose greater risk in terms of variability to claim costs than primary coverage, that many reinsurance contracts are excess of loss contracts in which the reinsurer agrees to pay claims for the primary company in excess of some specified retention limit. Since in essence the reinsurer assumes responsibility for the right-tail of a positively skewed loss distribution, reinsurer loss experience tends to be more volatile than that for primary companies. Harrington and Nelson further reasoned that default probabilities for insurers with a given premium-to-surplus ratio will vary according to intercompany differences in asset portfolios, insurance product mixes, and other factors. Therefore, simple guidelines about what constitutes a safe level of operations for the premium-to-surplus ratio are of limited value. Thus, this ratio should be examined on a line-of-business basis, with consideration given to the more volatile liability lines (such as commercial multiple peril, financial guaranty, medical malpractice).

18. Pinches & Trieschmann, Note 4 supra.
A study conducted by Hartford Insurance Company identified the ratios of gross leverage, gross leverage to net leverage, and the percentage of change in gross leverage to the percentage of change in net leverage to be effective variables in a statistical approach (univariate modeling) to assess the financial strength of reinsurance companies.

Liquidity

The ratio of liabilities to liquid assets, considered to be the current ratio of the industry, and its trend over time have been identified by several sources as effective measures of an insurer's ability to fund liabilities as they come due. The calculation of this ratio in an Axxon study included investments in affiliated companies in the denominator because removal of affiliate investments from assets seemed to make the ratio inappropriate for testing parent/holding companies. The authors reason that this treatment of affiliated investments is valid because a company that owns other insurance companies, each of which appears to be financially solid when tested, may be scored poorly by the statistical model simply because of the exclusion of affiliate values. A parent/holding company may have little insurance or investment risk beyond that represented by affiliates, and, hence, little need for surplus beyond that is held in the affiliates. The changes from year-to-year within the components of a given insurers' liability mix can also portend the onset of solvency problems. The statistical model specified by the Axxon study included a variable which represented the change in an insurer's liability mix, calculated as the summation of the absolute value of trend changes in eight liability accounts.

The ratios of agent balances to statutory surplus and assets have been cited by several sources as effective measures of receivable management. Eck found the ratio of agent balances to total assets to be higher in failed firms for the periods one, two, and three years before failure.

22. Eck, Note 9 supra.
In an analysis of property and liability solvency testing systems, the Illinois Guaranty Fund, the Illinois Department, and Milliman and Robertson proposed a cash flow factor modification to the existing Aetna statistical model. The modification was based on a cash availability test designed to measure the most critical components of an insurer’s cash flow and related an insurer’s loss, loss adjustment expense, and underwriting expense payments to its available funds. In their statistical model, Pinches and Trieschmann included the ratio of loss adjustment and underwriting expenses paid to net premiums written. This statistic was considered a measure of cash flow management because the numerator was intended to reflect controllable expenditures and the denominator was intended to reflect cash flow from sales.

Capital Adequacy

The change in surplus ratio, as adjusted for estimated acquisition expenses that would be deferred under GAAP, was considered an effective solvency predictor variable by the several researchers. A study by McKinsey & Co.23 the findings of which were adopted by the NAIC as the IRIS, found that the discriminatory effectiveness of the change in surplus ratio was significantly improved by the GAAP adjustment. [Note: McKinsey did not recommend that this adjustment be made to the ratios of liabilities to liquid assets or of premiums to surplus. The Aetna study included a statistical model that included a variable representing the extent to which a company’s change in surplus ratio exceeded 15 percent.

Capital Structure

During his tenure as NAIC president, North Dakota Comm. Earl Pomeroy's Solvency Agenda included the need for a model law to provide for a variable surplus requirement based on the nature and volatility of the business written. One approach to making this perspective operational, consistent with the

24. Pinches & Trieschmann, Note 4 supra.
<table>
<thead>
<tr>
<th>Category</th>
<th>Candidate Predictor Variable</th>
<th>Rationale/Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leverage</td>
<td>1 Net premiums written to</td>
<td>The net leverage ratio, considered a traditional measure of</td>
</tr>
<tr>
<td></td>
<td>policyholders surplus</td>
<td>underlying capacity, relates risk assumed to the surplus</td>
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<td></td>
<td></td>
<td>available to absorb loss variations. A higher value is</td>
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<td></td>
<td></td>
<td>intuitively correlated with insolvent firms as distressed insurers may</td>
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<td></td>
<td>aggressively write new business to increase</td>
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<td></td>
<td>cash flow, interpreted by Best as a measure of exposure</td>
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<td></td>
<td></td>
<td>to pricing errors in the company’s book of business.</td>
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<tr>
<td></td>
<td></td>
<td>Pinches and Triefsham found this ratio to be the best</td>
</tr>
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<td></td>
<td></td>
<td>single predictor variable within the context of their</td>
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<tr>
<td></td>
<td></td>
<td>statistical model. A ratio greater than 300% is considered</td>
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<td></td>
<td></td>
<td>unusual by the NAIC IRIS.</td>
</tr>
<tr>
<td></td>
<td>2 Commercial multiple</td>
<td>These measures (#2 - #9) can be viewed as indicators of the</td>
</tr>
<tr>
<td></td>
<td>pen premiums written to</td>
<td>relative mix of business written for possible explosive</td>
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<td></td>
<td>policyholders surplus</td>
<td>claim areas in relation to an insurer’s level of surplus.</td>
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<td>3 Financial guarantee net</td>
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<td>premiums written to</td>
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<td>policyholders surplus</td>
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<td>4 Medical malpractice net</td>
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<td>premiums written to</td>
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<td>5</td>
<td>Worker's compensation net premiums written to policyholders surplus</td>
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<td>6</td>
<td>Other liability net premiums written to policyholders surplus</td>
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<td>7</td>
<td>Auto liability net premiums written to policyholders surplus</td>
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<td>8</td>
<td>Auto physical damage net premiums written to policyholders surplus</td>
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<td>9</td>
<td>Surety net premiums written to policyholders surplus</td>
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<td>10</td>
<td>Direct premiums written to policyholders surplus</td>
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<td>11</td>
<td>Gross premiums written to policyholders surplus (Grass leverage ratio)</td>
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<td>12</td>
<td>Gross leverage to net leverage</td>
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<td>13</td>
<td>Trend change in gross leverage to trend change in net leverage</td>
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<tr>
<td>14</td>
<td>Net premiums written to loss and loss adjustment expense reserves</td>
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</tr>
</tbody>
</table>

The direct leverage ratio also relates risk assumed to the surplus available to absorb loss variations. This measure was one of six ratios included in Pinches and Trechmann’s final discriminant function. The gross leverage ratio also relates risk assumed to the surplus available to absorb loss variations. The numerator is comprised of direct premiums written plus reinsurance assumed.

Couser and Harrington (1989)
Pinches and Trechmann (1974)
Ludwig and McAuley (1986 est)
Ludwig and McAuley (1986 est)
<table>
<thead>
<tr>
<th>Category</th>
<th>Candidate Predictor Variable</th>
<th>Rationale/Explanation</th>
<th>Specific Source(s) (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquidity</td>
<td>15 Liabilities to liquid assets</td>
<td>This measure can be viewed as the current ratio of the industry, as firms are expected to maintain adequate liquidity to fund their liabilities as they mature. This measure also can provide an indication of possible implications for policyholders in the event of insurer liquidation. A ratio greater than 100% is considered unusual by the NAIC (1981). The calculation of this ratio for the American included investments in affiliated companies in the denominator because removal of affiliate investments from assets seemed to make the ratio inappropriate for testing a parent-holding company.</td>
<td>NAIC (1981)</td>
</tr>
<tr>
<td></td>
<td>16 Trend change - liabilities to liquid assets</td>
<td>The NAIC has cited this measure as an important predictor variable for insurer solvency surveillance. This measure represents the year-to-year trend change of liabilities to liquid assets.</td>
<td>NAIC IRIS</td>
</tr>
<tr>
<td></td>
<td>17 Change in liability mix</td>
<td>The American study stated that a large positive value for this measure may reflect operating changes which are often a symptom of developing financial problems. This measure represents the sum of the absolute values of trend changes in 8 liability accounts (losses, loss adjustment expenses, contingent commissions plus other expenses, taxes and licenses and fees, borrowed money, unearned premiums, dividends declared and unallocated to stock and policy holders and all other liabilities).</td>
<td>NAIC (1978)</td>
</tr>
</tbody>
</table>
18 Agents’ balances to policyholders

This measure can be viewed as an indicator of the degree to which an insurer’s solvency is dependent upon its assets, which frequently cannot be realized in the event of liquidation. A ratio greater than 40% is considered unusual by the NAIC IRIS.

19 Agents’ balances to total assess

This measure can be viewed as an indicator of receivables management. Eck found this measure to be higher in failed firms for all three years prior to failure studied. This measure was also one of six ratios included in Pinches and Trehimann’s final discriminant function.

20 Liquid assets to total issues

This ratio study found this measure to be an effective discriminator between distressed and nondistressed insurers.

21 C/e to total assets

This ratio study found this measure to be an effective discriminator between distressed and nondistressed insurers.

22 Cash flow intensification factor

The Illinois Guaranty Fund and Department and Milliman & Robertson study formulated this measure in an effort to relate a company’s loss, LAE, and underwriting expense payments to available funds (net premiums written, cash change in agents balance, and bonds maturing in one year).

23 Loss adjustment expenses paid plus underwriting expenses paid to net premium written

This measure can be viewed as an indicator of cash flow management because it relates controllable cash expenses to cash flow from sales. This measure was one of six ratios included in Pinches and Trehimann’s final discriminant function.
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<thead>
<tr>
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<th>Rationale/Explanation</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Capital adequacy and structure</td>
<td>24 Projected equity (loss) in unchanged premium to policyholders surplus</td>
<td>This measure can be viewed as an indicator of the extent to which sound, growing companies are possibly penalized by conservative statutory accounting requirements. This measure relates those policy acquisition expenses which would be deferred under GAAP to policyholders surplus.</td>
<td>Illinois Insurance Guaranty Fund, et al. (1979)</td>
</tr>
<tr>
<td></td>
<td>25 Trend change - policyholders surplus</td>
<td>This measure represents the year-to-year trend of statutory surplus (as adjusted for deferred acquisition expenses) to policyholders surplus. A ratio greater than 50% or less than 10% is considered unusual by the NAIC IRIS. The Amana study found the extent to which this measure exceeded 15% to be an effective discriminator between distressed and nondistressed insurers.</td>
<td>Amana (1978)</td>
</tr>
<tr>
<td></td>
<td>27 Unpaid losses to policyholders surplus</td>
<td>This measure can be viewed as a debt to equity ratio which relates an insurer's loss and loss adjustment expense reserves to policyholders surplus.</td>
<td>Illinois Insurance Guaranty Fund, et al. (1979)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NAIC IRIS</td>
</tr>
</tbody>
</table>
Predicting Troubled Insurers

38 Net operating surplus

This measure is expected to be an additional data input in the ratio which serves as an indicator of the leverage of a company relative to its shareholders' equity and is expected to be a target of management. This measure is a useful indicator of a company's ability to generate earnings and is used as a basis for measuring the company's overall financial health.

39 Leverage decomposition

This measure can be used as an indicator of the extent of debt financing relative to the company's equity. The lower the debt-to-equity ratio, the lower the risk of bankruptcy.

40 Return on equity

This measure is expected to be a target of management and is used as a basis for measuring the company's overall financial health.

41 Return on capitalization

This measure is expected to be a target of management and is used as a basis for measuring the company's overall financial health.

42 Total capitalization

This measure is expected to be a target of management and is used as a basis for measuring the company's overall financial health.

43 Net liabilities

This measure is expected to be a target of management and is used as a basis for measuring the company's overall financial health.
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Lengthened tail of unearned claims</td>
<td>1. Losses paid loss salvage (net payments) to losses incurred</td>
<td>This measure is typically referred to as the “paid to incurred ratio” and relates an insurer’s net loss payments (direct business plus reinsurance assumed lost reinsurance recovered) to net losses incurred.</td>
<td>Rappaport (1989)</td>
</tr>
<tr>
<td></td>
<td>2. Loss and loss adjustment expense reserves to losses and loss adjustment expense payments</td>
<td>This measure can be viewed, particularly when analyzed over time, as an indicator of extent to which an insurer’s tail of unearned claims may be lengthening. This measure relates an insurer’s loss and loss adjustment expense reserves for to currently-paid loss claims and expenses.</td>
<td>Ludwig and McAuley (1986)</td>
</tr>
<tr>
<td>Reserve adequacy and development</td>
<td>3. One year reserve development to policyholders surplus</td>
<td>This measure can be viewed as an indicator of the accuracy of reserve estimates made by an insurer one year ago in comparison to policyholders’ surplus reported at that time. A positive result is generally viewed as a deficiency (i.e., understimation of loss reserves), while a negative ratio generally indicates a redundancy (i.e., overestimation of loss reserves) based upon the company’s claim settlement and reserving activity during the current year. A ratio greater than 25% is considered unusual by the NAIC IRIS.</td>
<td>Illinois Insurance Guaranty Fund; et al (1979) Insurance Review, (November 1988) NAIC IRIS</td>
</tr>
</tbody>
</table>
4. Two-year reserve development to policyholders surplus

This measure can be viewed as an indicator of the accuracy of reserve estimates made by an insurer two years ago in comparison to policyholders' surplus reported at that time. A positive result is generally viewed as a deficiency (i.e., underestimation of loss reserves), while a negative ratio generally indicates a redundancy (i.e., overestimation of loss reserves) based upon the company's claim settlement and reserving activity during the past two years. A ratio greater than 25% is considered unusual by the NAIC IRIS.

Kim (1978)

5. Current estimated reserve deficiency to policyholders surplus

This measure can be viewed as an indicator of both the adequacy of current reserves and whether a company has corrected reserve deficiencies that may have existed in the past. The estimated deficiency reflects the difference between an estimate of required reserves (premiums earned multiplied by the average ratio of developed reserves to net premiums earned for the last two years) and actual reserves. A ratio greater than 25% is considered unusual by the NAIC IRIS.

Ludwig and McAuley (1986)

6. Two-year reserve development to net premiums earned

This measure can be viewed as an indicator of the accuracy of the estimates made by the company two years ago in relation to net premiums earned.

Kim (1978)

Ludwig and McAuley (1986)

NAIC IRIS

risk-based capital analytical approach adopted by the banking in-
dustry, involves deriving an insurer's reserves (and hence surplus) by
using industry averages of loss reserves to net premiums earned.

Loss Reserve Adequacy and Development

Lengthened Claims Tail According to CRS,17 the lengthening
of the claims' tail is the most important lasting industry develop-
ment that affects insurance company insolvencies; because a greater
proportion of the premium dollar is being set aside for payments to
be made in the future, uncertainty has grown about the ultimate
total of payments and the adequacy of the premiums and reserves.
This lengthening of the claims' tail has resulted from several trends:

- Premiums are being concentrated on the long tail and liability
  lines of business. As a consequence, the insurers' financial in-
  termediary role is also becoming more pronounced.
- Litigation has increased.
- Formal insurance coverage for some business lines has been
  supplanted by such alternative mechanisms as risk retention
  groups and higher deductibles.
- The formal insurance market has increasingly specialized in
  underwriting larger losses, which typically involve lengthier
  settlement procedures.

Reserve Development The GAO18 has cited underreserving for
losses, underpricing premiums, reinsurance problems, fraud, incom-
petence, and overexpansion as the principal factors in insurer insol-
vency. Numerous studies, such as the NAIC IRIS,19 have advocated
analyzing ratios that measure the one-year and two-year reserve de-
velopment and estimated reserve deficiency.

The Illinois Guaranty Fund, the Illinois Department, and the
Milliman and Robertson study20 also proposed a loss reserve adjust-
ment modification to the .15lna statistical model. This modification

27. Rappaport, Note 6 supra.
28. Insurance Failures, Note 2 supra.
29. NAIC, Note 8 supra.
entailed a restatement of loss reserves using historical paid loss trends as a basis for projection. The authors criticized the drawing of conclusions on the adequacy of loss reserves by the customary procedure of using Schedule P data to compare estimates of total incurred losses for the same accident-year at various points. They argued that such an approach can be misleading, because it attributes chronic underreserving to a company that moves from an inadequate to an adequate reserving position. The authors advocated a statistic to supplement the ETA system based on the assumption that each accident-year will follow roughly the same pattern as time elapses from the year when the accidents occurred until all losses are finally paid. As a result, accident claims, and paid loss data can be developed to their ultimate values. Such an approach therefore provides an estimate of total incurred losses without using loss reserves in the calculation procedure.

Profitability, Underwriting Results, and Operational Efficiency

Profitability The GAO conducted an analysis of the profitability of the medical malpractice and general liability lines by deriving after-tax cash flow for each line as a percentage of net premiums earned. After-tax cash flow was considered equivalent to net premiums earned plus imputed interest income less losses paid, loss adjustment expenses paid, underwriting expenses paid, and federal income taxes paid. The GAO argued that the theoretically appropriate method for analyzing the industry’s financial health was to compute profitability based on the discounting of loss reserves, the inclusion of unrealized capital gains in income, and the excluding of policyholder dividends from expenses.

Pinches and Treischmann studied a measure, return on adjusted surplus, in which statutory surplus was adjusted for both surplus aid and the difference between bonds at market value and bonds at original cost. They considered this adjusted surplus variable to be

32. Pinches & Treischmann, Note 4 supra.
a more accurate measure of an insurer’s equity than statutory surplus because if a company has financial difficulties, the reinsurer will demand the return of the unearned earned commission on the reinsurance. Therefore, from the perspective of an insurer liquidation, surplus is effectively overstated by both this amount and the difference between market value and original cost of insurer’s bond portfolio.

Underwriting Results and Operational Efficiency  The industry’s traditional measure of underwriting results is the combined ratio (the sum of the loss, expense, and dividend ratios), which relates losses and expenses to premiums. Security analysts tend to focus on the trend of an insurer’s underwriting results, the components of the combined ratio, and the ratios of paid losses to premiums earned and the change in the loss reserve to premiums earned. Eck found that the combined ratio was higher for failed firms in the periods one, two, and three years before insolvency. McKinsey recommended that the two-year overall operating ratio (i.e., IRIS ratio <1 be modified by removing investment income, thereby converting the measure to a combined ratio. McKinsey maintained that this simplified computation would not diminish the measure’s ability to discriminate effectively between distressed and non-distressed insurers. However, the NAIC task force overruled this suggestion and retained the operating ratio, viewing it as a more adequate measure of profitability than the combined ratio.

Ambrose and Seward found in their statistical model that both the loss ratio and the ratio of loss adjustment expenses to losses incurred were effective predictor variables. They concluded that actual loss experience, as measured by the loss ratio component of the combined ratio, helped differentiate between insolvent and solvent insurers. They also observed that the ratio of loss adjustment expenses to losses incurred—considered a measure of claims management efficiency—was higher among insolvent firms. This observation supports their supposition about the relative inefficiency of distressed companies.

33. Eck, Note 9 supra.
35. Ambrose and Seward, Note 17 supra.
The analyst should study an insurer’s relative profitability within the context of a company’s peer group whose members have adopted a similar marketing strategy (e.g., compare direct writers with other direct writers). For example, a Merrill Lynch research report on Geico emphasized Geico’s successful direct marketing strategy and the resulting low-cost structure, which the company has used to generate consistently high underwriting margins.

Reinsurance Activities

Measures of Overall Reinsurance Activity The extent to which an insurance company engages in reinsurance transactions, as both buyer and seller, and the resulting reliance on fee income can indicate an increased risk of insolvency. In many instances, cedents will use the size of the reinsurer’s surplus to limit the amount they cede to any one reinsurer. This strategy is used to reduce the chance that the reinsurer will retrocede a portion of the risk because such retrocessions typically lead to delays in claim payments, particularly if the reinsurance relationship is being terminated or commuted. Generally, a reinsurer is more likely to retrocede substantial portions of an assumed risk when the exposure exceeds one per cent of its surplus (a primary reinsurer will rarely expose more than one per cent of its capital to any one risk). Consequently, cedents generally need not consciously limit the amount they cede to a primary reinsurer, however, limits of one per cent of reinsurer surplus for second-tier reinsurers and 0.5 per cent for third-tier reinsurers can provide a degree of security. Many companies also use the size of the cedent’s surplus to determine the limit of the amount that they cede to any one reinsurer. This strategy helps limit the amount of exposure to any one reinsurer, particularly non-primary reinsurers, in the amount of a single risk and the accumulation of balances recoverable. The reasoning here is that the overall magnitude of the exposure should not exceed that which the cedent would be willing to retain on any one risk or catastrophe.36

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<thead>
<tr>
<th>Candidate Predictor Variable</th>
<th>Rationale/Explanations</th>
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<tbody>
<tr>
<td>1 Net operating income to net premiums earned</td>
<td>This measure can be viewed as an indicator of an insurer's return on sales. The measure relates net income (less capital gains (or plus capital losses) to net premiums earned. (Mayer 1996, etc.)</td>
</tr>
<tr>
<td>2 Return on premiums (profit margin)</td>
<td>This measure can be also viewed as an indicator of an insurer's return on sales. This measure relates net underwriting gain or loss plus net investment gain/loss to net premiums earned. (BarNiv 1990)</td>
</tr>
<tr>
<td>3 Net income to policyholders surplus</td>
<td>This measure can be viewed as an indicator of an insurer's return on equity. (Rina 1978, Best's Key Rating Guide (1987-1989), Nelson 1971)</td>
</tr>
<tr>
<td>4 Net income to adjusted surplus</td>
<td>This measure can also be viewed as an indicator of an insurer's return on equity. For the purpose of calculating this measure, the surplus denominator is adjusted for both surplus and the difference between bonds at market value and bonds in original cost. Pinches and Trieschmann considered this adjusted surplus figure to be a more accurate measure of an insurer's equity position than statutory surplus because it realistically considers the likelihood that, if an insurer experienced financial difficulties, it's reinsurers would demand the return of the unearned ceded commission on the reinsurance. As a result of this likelihood, Pinches and Trieschmann reasoned that statutory surplus was overstated on a liquidation basis by this amount as well as the difference between the market value of bonds and their original cost. (Pinches and Trieschmann 1974)</td>
</tr>
</tbody>
</table>
5 Net underwriting gain or loss in policyholders' surplus

The study found this measure to be an effective discriminant between distressed and nondistressed insurers. This measure relates a proxy for operating earnings, net underwriting gain/loss, to policyholders' surplus. 

6 Return on surplus

This measure can also be viewed as an indicator of an insurer's return on equity. This measure relates net underwriting gain/loss plus net investment gains/loss to policyholders' surplus. 

7 Net income to total assets

This measure can be viewed as an indicator of an insurer's profitability. 

8 One-year overall operating ratio

This measure reflects the sum of the loss expense and investment income ratios. 

9 Two-year overall operating ratio

This measure can be viewed as an indicator of overall profitability (i.e., a ratio less than 100% represents a profit, and a ratio greater than 100% represents a loss). This measure reflects the sum of the two-year loss expense and investment income ratios. A ratio greater than 100% is considered unusual by the NAIC IRIS. 

10 After-tax cash flow on line of business basis

The U.S. GAO utilized this measure in a study of the profitability of the medical major-cause and general liability lines of business. This measure reflects after-tax cash flow for these lines, inclusive of unrealized capital gains and exclusive of policyholder dividends, with discounting of loss reserves as a percentage of net premiums earned. One may therefore view the resulting after-tax cash flow as equivalent to net premiums earned plus interest income (claimed upon 10-year treasury securities) less loss paid, LAE paid, underwriting expenses and FIT paid.
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</thead>
<tbody>
<tr>
<td>Underwriting results and</td>
<td>11 Combined ratio (and trend</td>
<td>The combined ratio can be viewed as the industry’s traditional measure of both underwriting results and the underlying profitability of the business. This measure reflects the sum of the loss, expense and dividend ratios. In contrast with the NAIC IRRES overall operating ratio, the combined ratio does not consider the impact of an insurer’s investment results.</td>
<td>Best’s Key Rating Guide (1987 - 1990)</td>
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<td>operational efficiency</td>
<td>change therein)</td>
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<td>Eck (1982)</td>
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<td>Evans (1988)</td>
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<td>Ludwig and McAuley (1986)</td>
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<td>Merrill Lynch (February 1990)</td>
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<td>Morgan Stanley (July 1987)</td>
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<td>Pinches and Triesmans (1974)</td>
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<td></td>
<td>12 Loss ratio (and trend</td>
<td>This measure relates losses and loss expenses incurred to not premiums earned. Ambrose and Seward observed a higher loss ratio among insolvent firms (as opposed to the expense ratio, which did not prove to be a significant variable) and inferred that when the components of the combined ratio are analyzed separately, actual loss experience as opposed to the expense ratio provided differentiation between insolvent and solvent firms. The analysis may want to monitor the annual change in incurred losses in relation to the annual change in net premiums written because if premium growth lags the growth in incurred losses, then underwriting losses may mount.</td>
<td>Ambrose and Seward (1988)</td>
</tr>
</tbody>
</table>
13 Paid losses to net premiums earned
This measure a components of the overall loss ratio relates
the level of paid losses to premium earned.
14 Unadjusted ratio (and change from
year-to-year)
This measure a components of the combined ratio can be
used as an indicator of claims paid and the change in the
net unearned premium liability account.
15 Expected ratio (and change from
year-to-year)
This measure a components of the combined ratio can be
used as an indicator of claims paid and the change in the
net unearned premium liability account.

16 Loss adjustment
expense ratio
This measure can be used as an indicator of claims
reserve adequacy. A ratio of 2.0 indicates reserves are
adequate, whereas a ratio of 0.5 indicates reserves are
deficient. This measure is calculated by dividing the
loss adjustment expenses by the earned premiums.

17 Loss adjustment
expense ratio (and change from
year-to-year)
This measure can be used as an indicator of claims
reserve adequacy. A ratio of 2.0 indicates reserves are
adequate, whereas a ratio of 0.5 indicates reserves are
deficient. This measure is calculated by dividing the
loss adjustment expenses by the earned premiums.
The American Institute of Certified Public Accountants ("AICPA") has noted that excessive or uncontrolled growth in premiums may cause a company to enter into nontransfer-of-risk reinsurance arrangements to relieve the statutory surplus strain associated with writing new business. McKinsey modified the reinsurance asset ratio before the final approval by the NAIC of IRIS. The test was originally intended to measure funds held by reinsurers as well as surplus aid but was amended to focus exclusively on surplus aid in order to increase its relative effectiveness.

Measures of the Quality of the Reinsurance Business The NAIC, as part of its solvency agenda, plans to supply additional support to the states in evaluating reinsurance contracts and reinsurance solvency by providing guidance for distinguishing between risk transfer and surplus aid arrangements and by establishing a process for reinsurers to certify financial information for them to qualify for NAIC listing.

A. M. Best has reported that reinsurance-related statutory accounting rules could harm the industry by causing ceding insurers to write off up to $4 billion in surplus, thereby shrinking capacity and possibly prompting further insolvencies. The NAIC's 90-day rule is supposed to strengthen solvency regulation, by penalizing insurers with reinsurance receivables that are more than 90 days overdue. The rule applies to the 1989 and later annual statements and requires ceding insurers to disclose the extent of their uncollected reinsurance claims and to reduce their surpluses by 20 percent of the overdue reinsurance recoverables or, in the case of slow-paying reinsurers, by 20 percent of all due reinsurance recoverables (slow-paying reinsurers are those that have not remitted the billed amount to their ceding company within 90 days of the due date stipulated in the contract or within 120 days of the date of notification if the contract is silent on a due date). Amounts in dispute are exempt from the surplus penalty.

The quality of existing reinsurance coverages, particularly that of liability coverages written in the early 1980s, may threaten insurer stability. The relatively inexpensive reinsurance coverages written
during this period may yield significant industry losses when certain large and complex cases are soon resolved.

Special Characteristics of Reinsurance Companies Because of the relatively arcane nature of the domestic reinsurance business, the fact that many reinsurers are based in foreign countries, and the complexities of the retrocession chain, it may be difficult to assess the financial condition of a reinsurance company. Ludwig and McAuley\(^41\) criticized the inability of the NAIC’s IRIS, Best’s Ratings, and the AC maize models to forecast adequately reinsurer insolvency. The researchers argued that this lack of forecasting ability was because the models were derived from general insurance industry data rather than a specific reinsurance company data base.

Underwriting and Sales Practices

Measures of Premium Growth Security analysts typically examine the change in an insurer’s premiums written from the perspective of volume/rate by studying the changes in the number of policies in force and in the average premium per policy. Information such as this should then be studied to determine if it is consistent with management objectives. For example, if management has emphasized discipline in underwriting, one would expect to see a decrease in accepted risks during periods of depressed prices.

The annual percentage change in net premiums written is also considered an important indicator of insurer stability. The NAIC’s IRIS set the acceptable range for this measure between positive 33 per cent and negative 33 per cent. This statistic should be scrutinized by the analyst on a specific line-of-business basis to investigate whether the insurer has recently written new, volatile, or unfamiliar business.

Cathers and Harrington\(^42\) used the annual percentage change in direct premiums written as a measure of growth in premiums within the context of a statistical approach to predict insurer insolvency. They argued that the use of such a measure was theoretically superior to the use of a premiums-based leverage variable which, because

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\(^41\) Ludwig & McAuley, Note 20 supra.

\(^42\) Cather & Harrington, Note 12 supra.
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<tbody>
<tr>
<td>Measures of overall reinsurance activity</td>
<td>1 Reinsurance ceded to affiliates and non-affiliates to affiliates in gross premiums written</td>
<td>These measures can be viewed as overall indicators of the level of ceded reinsurance business in which an insurer engages. A reinsurer that cedes a substantial portion of business will generate both commission income from cessions and underwriting income from its reinsurance. An overreliance on commission income can lead a reinsurer to be more concerned about volume than profitability, and thereby weaken its financial solvency. This measure can also be viewed as an indicator of the level of ceded reinsurance business in which an insurer engages. In many instances, an insurer will limit the amount of business they cede to any one reinsurer on the basis of the cedents level of policyholders surplus. This is premised upon the rationale that the exposure to any one reinsurer, especially non-prominent reinsurers, in terms of both the amounts of one risk and the accumulation of balances recoverable should not exceed the largest amount that the cedent is willing to retain on any one risk or catastrophe. This measure can also be viewed as an indicator of the level of ceded reinsurance business in which an insurer engages. Cather and Harrington chose to focus upon the volume non-affiliate reinsurance business engaged in by an insurer.</td>
<td>Best's Review (January 1990) Insurance Review, (November 1988) Nelson (1971) Best's Review (January 1990) Cather and Harrington (1989)</td>
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<tr>
<td></td>
<td>2 Reinsurance ceded to affiliates and non-affiliates to direct premiums written</td>
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<td></td>
<td>3 Reinsurance ceded to affiliates and non-affiliates to policyholders surplus</td>
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<td></td>
<td>4 Reinsurance ceded to non-affiliates to policyholders surplus</td>
<td></td>
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</tbody>
</table>
5 Recommends new management from affiliate to parent
6 Recommends new management from parent to affiliate
7 Recommends new management from affiliate to affiliate
8 Recommends new management from parent to parent
9 Recommends new management from parent to affiliate

This measure can also be viewed as an indicator of the engagement level of the parent with the affiliate. Careful engagement on the part of the parent is essential to ensure that the affiliate is effectively managed.


The measure can also be viewed as an indicator of the engagement level of the parent with the affiliate. Careful engagement on the part of the parent is essential to ensure that the affiliate is effectively managed.

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<tr>
<td>15</td>
<td>Separately reported net reinsurance premiums to total net premiums written</td>
<td>In certain instances, reinsurance premiums are not allocated to individual lines of business by some insurers. Instead, assumed and ceded reinsurance premiums are reported on an aggregated basis in the annual statement. Cather and Harrington hypothesized that these premiums may have greater risk than the remaining lines of business and inferred that the ratio of such premiums to total net premiums to be potentially reflective of high-risk behavior.</td>
<td>Cather and Harrington (1989)</td>
</tr>
<tr>
<td>11</td>
<td>Trend change - reinsurance premiums ceded to non-affiliates</td>
<td></td>
<td>Cather and Harrington (1989)</td>
</tr>
<tr>
<td>12</td>
<td>Trend change - reinsurance premiums assumed from non-affiliates</td>
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<td>Cather and Harrington (1989)</td>
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</table>
This measure can be viewed as an indicator of the overall quality of an insurer's reinsurance business. This measure is based on the total reinsurance surplus of a reinsurer, classified as unearned, earned, or both. The measure is calculated by taking the total reinsurance surplus of a reinsurer and applying a specified percentage to it. The measure is then divided by the total amount of reinsurance premiums written by the reinsurer. This measure can also be used as an indicator of the overall financial stability of a reinsurer.

14 Total change in reinsurance surplus during the year.
15 Gross written premiums during the year.
16 Net earned surplus during the year.
17 Total reinsurance premiums written during the year.
18 Total reinsurance business written during the year.
19 Total reinsurance business written during the year (in 1000s).
20 Total reinsurance business written during the year (in %).
21 Total reinsurance business written during the year (in % of total business).
22 Total reinsurance business written during the year (in % of total gross premiums written).
23 Total reinsurance business written during the year (in % of total net premiums written).
24 Total reinsurance business written during the year (in % of total earned surplus).
25 Total reinsurance business written during the year (in % of total reinsurance surplus).
26 Total reinsurance business written during the year (in % of total reinsurance premiums written).
27 Total reinsurance business written during the year (in % of total reinsurance business written).
28 Total reinsurance business written during the year (in % of total reinsurance business written (in 1000s)).
29 Total reinsurance business written during the year (in % of total reinsurance business written (in %)).
30 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total business)).
31 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total gross premiums written)).
32 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total net premiums written)).
33 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total earned surplus)).
34 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total reinsurance surplus)).
35 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total reinsurance premiums written)).
36 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total reinsurance business written (in 1000s))).
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40 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total reinsurance business written (in % of total net premiums written))).
41 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total reinsurance business written (in % of total earned surplus))).
42 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total reinsurance business written (in % of total reinsurance surplus))).
43 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total reinsurance business written (in % of total reinsurance premiums written))).
44 Total reinsurance business written during the year (in % of total reinsurance business written (in % of total reinsurance business written (in % of total reinsurance business written (in 1000s)))).
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<tbody>
<tr>
<td>Measures of premiums growth</td>
<td>1 Change in net premiums written</td>
<td>This measure can be viewed as a primary indicator of an insurer's revenue growth and potential financial distress. As significant increases or decreases in net premiums written may indicate a lack of stability in the company's operations. A ratio greater than positive 33%, or less than negative 33% is considered unusual by the NAIC IRIS. The AICPA suggests guidance which cautions auditors to carefully examine companies which evidence rapid premium growth into new, volatile or unfamiliar lines of business in which it does not possess the requisite experience to underwrite adequately.</td>
<td>AICPA (1989) Ludwig and McAuley (1986); Insurance Review, (November 1968) NAIC IRIS</td>
</tr>
<tr>
<td></td>
<td>2 Change in direct premiums written</td>
<td>This measure can be viewed as an indicator of an insurer's internal revenue growth.</td>
<td>Cather and Harrington (1989)</td>
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<td></td>
<td>3 Net premiums written to net premiums earned</td>
<td>The measure can also be viewed as an indicator of an insurer's revenue growth. A measure which is below 1.0 indicates that an insurer is not writing business at a level adequate to sustain current accrual-basis revenue. This measure can be viewed as a partial indicator of whether an insurer is engaging in the practice of cash flow underwriting. The AICPA suggests guidance which cautions auditors to carefully examine companies which evidence a net premiums written growth rate which outpaces the industry growth rate.</td>
<td>AICPA (1989)</td>
</tr>
<tr>
<td>Cash flow underwriting</td>
<td>4 Net premiums written growth rate of company vs. industry</td>
<td></td>
<td>AICPA (1989)</td>
</tr>
<tr>
<td>Policyholder selection</td>
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<td>------------------------</td>
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<tr>
<td><strong>5 Trend in combined ratio combined with general level of interest rates</strong></td>
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<tr>
<td>This measure can also be viewed as a partial indicator of whether an insurer is engaging in the practice of cash flow underwriting. The use of this measure is based upon the viewpoint that cash flow underwriting represents the intentional writing of unprofitable business on the part of an insurer in order to generate investable funds. Therefore, certain researchers have hypothesized that a possible approach to measure of this phenomenon may be to correlate the trend in an insurer's combined ratio with the general level of interest rates.</td>
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<tr>
<td><strong>6 Underwriting expense incurred to loss adjustment expenses plus underwriting expense plus investment expense</strong></td>
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<td>Pinches and Triechmann found this measure to be an effective discriminator between distressed and nondistressed insurers within the context of their statistical model. Pinches and Triechmann found that solvent companies spend more than distressed companies for both underwriting procedures and agent compensation, and hypothesized that distressed firms are too strict in choosing their clients.</td>
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<tr>
<td><strong>7 Selected underwriting expenses to direct premiums written</strong></td>
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<tr>
<td>This measure can also be viewed as an indicator of the resources which an insurer devotes to the policyholder selection process. This measure relates expenses incurred in the policyholder selection process (including commissions, taxes and licenses) to direct premiums written. Eck retained that the better managed firm would be expected to spend more on the underwriting process and observed this ratio to be higher for nonfailed firms in the periods one and two years prior to failure. The analysis may want to study the relationship between an insurer's direct premium's written by state or region (statutory Schedule T) with regional macroeconomic indicators and considerations.</td>
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<td><strong>8 Sales diversification</strong></td>
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<td>Insurance Information Institute (May 1989)</td>
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<td><em>Insurance Review,</em> (November 1988)</td>
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<td>Rappaport (1989)</td>
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<td>Pinches and Triechmann (1974)</td>
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<td>Eck (1982)</td>
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it relies upon reported loss reserves, will be understated when an insurer's loss reserves are understated.

**Cash-Flow Underwriting (CFU)** CFU is the practice of deliberately underpricing insurance coverage, typically resulting in a statutory loss (i.e., a combined ratio greater than 100), to generate investable funds. Insurers that engage in CFU hope that the claim will not have to be paid until they have earned investment income sufficient to cover the loss. Companies also engage in CFU in an attempt to generate sufficient premium income to avoid selling any book value assets (such as bonds) at current market values, which would generate book losses. This form of CFU has been termed "asset maintenance underwriting." As a result, CFU tends to occur more frequently during periods of high interest rates when the lure of investment gains encourages a deviation from conservative underwriting practices. The analyst should analyze the correlation between trends in an insurer's combined ratio, the general level of interest rates and the tail of the insurer's predominant lines of business. The AICPA\(^{43}\) has cited that rapid growth in premium volume, particularly during periods in which the industry's overall premium growth rate is slow, may also serve as an indication that the company is engaged in CFU.

**Policyholder Selection** Based on the supposition that distressed firms are not as select in their clients as solvent firms (as indicated by their lower underwriting expenditures vis-à-vis solvent firms), certain researchers have hypothesized that the well-managed firms spend more on the underwriting process in an attempt to ensure the profitability of the insurance operation. Eck\(^{44}\) found that the ratio of expenses incurred in the policyholder selection process to direct premiums written was higher for non-failed firms in the periods one and two years before failure.

Pinches and Trischmann\(^{45}\) found that the ratio of underwriting expenses to loss adjustment expenses plus investment expenses plus underwriting expenses indicated that non-distressed companies

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43. AICPA, Note 15 supra.
44. Eck, Note 9 supra.
45. Pinches & Trischmann, Note 4 supra.
spend more for underwriting procedures and agent commission than do distressed companies.

Other The company’s direct premiums written by line of business should be analyzed on a geographic basis and related to regional and macroeconomic indicators and considerations.

Other

Size Effect A. M. Best⁴⁶ has advanced an argument to support the strategy of primary insurers in selecting large reinsurers to ensure security and collectability of balance due. Their justification was based on the strong relationship between size and security, evidenced by the fact that all of the approximately 501 insolvencies during the past 50 years involved smaller companies. This statement was supported by the fact that the largest insurer in the United States to become insolvent in the past 50 years was the Mission Insurance Group, which at its peak was the 53rd largest property/casualty insurance group in the nation. Harrington and Nelson⁴⁷ used insurers’ net premiums written as an independent variable in their premiums-to-surplus regression equation. Their rationale was based on the law of large numbers coupled with the assumption that the variance of underwriting profit margins should decline at a decreasing rate as net premiums written increases, other things being equal.

The 50 insolventst studied in the Atma⁴⁸ study were also small, averaging $11 million in assets. Only two companies had assets greater than $50 million.

Organization/Marketing Type It is important to consider various affiliated company, ownership or corporate form issues when analyzing the financial statements of a property/casualty insurance company. The CRS⁴⁹ study emphasized that instances of insurer insolvency often involve various holding company manipulations,

⁴⁶ That Insurer Feeling, Note 37 supra.
⁴⁷ Harrington & Nelson, supra.
⁴⁸ Atma Life & Casualty, Note 31 supra.
⁴⁹ Rappaport, Note 6 supra.
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<tbody>
<tr>
<td>Size effect</td>
<td>1 Three-year average net</td>
<td>This measure can be viewed as an indicator of insurer size. The analysis may wish to</td>
<td>Best's Review (January 1990)</td>
</tr>
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<td></td>
<td>premiums earned</td>
<td>consider an insurer's financial characteristics within the context of the company's peer</td>
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<td>group. <em>Best's Review</em> cited the fact that all of the approximate 500 insolvencies over the past 50 years have been confined to smaller companies as evidence of the strong relationship between insurer size and financial security.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 Three-year average net</td>
<td>This measure can also be viewed as an indicator of insurer size.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>premiums written</td>
<td>Harrington and Nelson used this measure as an independent variable in order to control for insurer size, in a regression model designed to estimate an insurer's premium-to-surplus ratio. The researchers hypothesized that, other things being equal and based upon the law of large numbers, the variance of underwriting profit margins should decline at a decreasing rate as net premiums written increase.</td>
<td>Harrington and Nelson (1986)</td>
</tr>
<tr>
<td></td>
<td>3 Net premiums written</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>This measure can also be viewed as an indicator of insurer size.</td>
<td>Best's Key Rating Guide (1987 - 1990)</td>
</tr>
<tr>
<td></td>
<td>4 Policyholders surplus</td>
<td>The A. M. Best Company assigns a financial size category to each rated insurance company based upon the level of adjusted policyholder's surplus</td>
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<td>5</td>
<td>Total assets</td>
<td>This measure can also be viewed as an indicator of insurer size. The Alpha study analyzed the financial characteristics of 50 insolvent insurers and found the mean of total assets to be $11 million, which the researchers cited was indicative of the relatively small size of the majority of distressed insurance companies. Harrington and Nelson used this measure, as an independent variable in a regression model designed to estimate an insurer’s premium-to-surplus ratio. The researchers included this measure in order to study the potential for risk reduction associated with group-volume and to examine the allocation of surplus among affiliated insurers in relation to firm size.</td>
<td>Harrington and Nelson (1986)</td>
</tr>
<tr>
<td>6</td>
<td>Insurers net premiums written to insurer’s affiliated group property/casualty net premiums written</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Conglomerate ownership</td>
<td>Harrington and Nelson used this measure, as an independent dummy variable in order to control for the possible effects of diversification, in a regression model designed to estimate an insurer’s premium-to-surplus ratio.</td>
<td>Harrington and Nelson (1986)</td>
</tr>
<tr>
<td>8</td>
<td>Corporate form</td>
<td>Harrington and Nelson used this measure, as an independent dummy variable in order to control for the possible effects of ownership form, in a regression model designed to estimate an insurer’s premium-to-surplus ratio.</td>
<td>Harrington and Nelson (1986)</td>
</tr>
<tr>
<td>9</td>
<td>Market type</td>
<td>Harrington and Nelson used this measure, as an independent dummy variable in order to control for the possible effects of distribution systems, in a regression model designed to estimate an insurer’s premium-to-surplus ratio.</td>
<td>Harrington and Nelson (1986)</td>
</tr>
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(e.g., funneling of premium dollars to an upstream parent, which relates the concern of policyholder security to an unregulated holding company and to the deliberate overvaluing of intercompany securities).

Harrington and Nelson\(^5\) used the ratio of property/casualty net premiums written for the insurers' affiliated group divided by the insurer's net premiums written as an independent variable in their premiums-to-surplus regression equation. The researchers attempted to examine the influence of affiliated insurers on the individual insurer's premium-to-surplus decision. Insurance companies typically participate in group reinsurance arrangements that involve the pooling of premiums and losses among group members. This variable was included to control for the possible risk reduction associated with group volume and to examine the allocation of surplus among affiliated insurers in relation to firm size. The researchers also included 1) a conglomerate variable (equal to one if the insurer's affiliated group was owned by a conglomerate, and zero otherwise) to control for the possible effects of diversification into other areas of business and 2) a corporate form variable (equal to one for a mutual insurer, and zero otherwise) to control for the possible effects of ownership form. The researchers also included a variable in their premium-to-surplus regression equation to control for the possible effects of differences in an insurer's distribution system (equal to one for a direct writer, zero otherwise).

**Conclusion**

This paper has attempted to provide a framework to assist the researcher, financial analyst, regulator, or auditor in analyzing the financial statements of a property/casualty insurance company. The paradigm presented is intended to serve as a springboard to encourage future efforts at developing effective methods, models, and systems both for solvency surveillance and analytical review of the property/casualty insurance industry.

\(^{50}\) Harrington & Nelson, Note 5 supra.
Introduction


Property-Casualty insurance has long endured underwriting cycles—alternating periods of rising and falling premium rates with corresponding high and low profits. The cycle of the early 1980s, though, was unusual in several respects: (a) it affected a line of business, General Liability, that had been relatively exempt from earlier cycles; (b) it was longer and far more severe than previous cycles, with relentless price-slaughtering in the early 1980s followed by premium rate increases of over 100% for many classes in the mid-1980s; and (c) its harshness precipitated additional rate regulation in some jurisdictions, such as flex rating, as well as an antitrust action against various insurers and trade organizations by the attorneys general of twenty states, leading eventually to a Supreme Court decision in June 1993 and the reorganization of the Insurance Services Office in December 1994.

Mitigating the effects of the underwriting cycle requires knowledge of its causes. The NAIC therefore commissioned two research teams, one from the Wharton School at the University of Pennsylvania (headed by J. David Cummins) and one from the University of South Carolina (headed by Scott Harrington) to examine the causes of the 1980s underwriting cycle and to prepare public policy recommendations for future recurrences of this phenomenon.

The fruit of these efforts was the volume published in 1991 by the NAIC: Cycles and Crises in Property/Casualty Insurance: Causes and Implications for Public Policy, edited by Cummins, Harrington, and Robert Klein (research director of the NAIC), with further contributions by Neil A. Doherty, James R. Garvey, Patricia M. Danzon, James B. McDonald, Lawrence A. Berger, Barbara D. Stewart, Richard E. Stewart, and Richard S. L. Roddis. In the Fall of 1991, the Journal of Insurance Regulation published the executive summary from this volume, which is reprinted here.
Two questions underlie this research; they are answered differently by the various authors and they have opposing public policy implications:

• Was the General Liability "crisis" of the mid 1980s, with its rapidly rising premiums and tightened underwriting, a severe instance of underwriting cycles or a phenomenon sui generis? Will understanding the causes of this crisis enable regulators to better deal with future underwriting cycles?

• Are underwriting cycles caused by factors external to the insurance industry, such as changes in interest rates or expected losses, or by factors internal to the industry, such as aggressive competition and price cutting by new entrants?

Casually actuaries develop rate indications for these insurance products, based upon exacting analyses of past claim costs and historical loss cost trends, only to find that the marketplace — oblivious to their studies — sets the actual prices. Inexperienced and innocent actuaries often feel tempted to "buck" the cycle, to set adequate but not redundant rates each year. Yet insurers who ignore the market forces quickly lose market share at one end of the cycle and profits at the other end of the cycle, with little compensation for either.

To effectively price insurance products through the cycle, the actuary must understand the forces that drive it. Indeed, many of these forces are residents of the actuary's domain, and the discerning analyst may forecast their effects on premium rate levels. For instance, the underwriting cycle of the 1980s is sometimes ascribed to interest rate volatility, since competitive premium rates depend on the present values of anticipated losses and expenses. But as Cummins, Harrington, and Klein discuss, this effect of interest rate changes can be only a partial explanation: underwriting cycles are evident in operating returns just as in underwriting profits. [As a result, Doherty and Garven's chapter in the full volume, titled "Capacity and the Cyclicity of Insurance Markets," examines the effect of interest rate changes on an insurer's equity, not just on the present values of losses. Rising interest rates decrease the market values of insurers' assets and liabilities. The net effect is to decrease industry equity with corresponding effects on overall capacity. Since regulators can not control interest rate fluctuations, they have little ability to mitigate underwriting cycles.]
Other analyses see the General Liability crisis of the 1980s as a rational response to changing estimates of expected losses, not simply as an instance of periodic underwriting cycles. The joint, severe, and retroactive liability for pollution damages imposed by CERCLA ("Superfund") in 1980, and the new judicial interpretation of the pollution exclusion in the Comprehensive General Liability policy form in the early 1980s, led to revised loss expectations by insurers. Several chapters in the full volume, whose conclusions are summarized in the JIR article, take this perspective. For instance, Cummins and Danzon, in "Price Shocks and Capital Flows in Liability Insurance," argue that past losses require insurers to raise rates on new policies in order to attract equity capital. Cummins and McDonald, in "Risky Probability Distributions and Liability insurance Pricing," use ISO data by class and by year to show that liability loss distributions became "riskier" (i.e., the distribution became flatter, or the loss severities became more volatile) in the 1980s. Berger and Cummins, in "Adverse Selection and Price-Availability Crises in Liability Insurance Markets," extend the Rothschild-Stiglitz model of separating equilibria in insurance and argue that a rational response to the increased riskiness is to lower policy limits.

From these studies, the authors of the JIR article conclude that "underwriting cycles and price/availability crises...are phenomena primarily caused by forces—loss shocks and interest rates—that are not subject to direct regulatory or insurer control." But this view is contested by other analysts, in fact, several other studies in the full volume have different implications. For instance, "A Brief History of Underwriting Cycles," by Barbara Stewart, Richard Stewart, and Richard Roddis, finds similar "life-cycle" patterns for most lines of insurance, with profit fluctuations most severe when the line is young. The 1980s underwriting cycle was unusual in that an old line, General Liability, reemerged as a new line and experienced the competitive turbulence of a new form of business.

Similarly, Harrington and Danzon, in "Price-Carrying in Liability Insurance Markets," provide a new and keen perspective on insurance competition. A competitive market is similar to an auction, in which the firm presenting the lowest cost bid receives the contract. Suppose insurers properly estimate average loss costs, but the uncertainty inherent in future projections makes some estimates too high and others too low. Consumers will purchase the lower priced policies, and industry profitability will suffer. Sophisticated insurers
have learned to adjust their loss estimates to avoid this “winner’s curse.” Naive insurers may not do so, leading even their peer companies to reduce rates in order to preserve their market shares. This interpretation, like the one by Stewart, Stewart, and Roddis, sees underwriting cycles as phenomena at least partially internal to the insurance industry, not caused solely by forces alien to insurer control.

Understanding underwriting cycles is crucial to the casualty actuary’s role. The *Journal of Insurance Regulation* article, as well as the chapters in the full volume published by the NAIC, shows the diversity of explanations for underwriting cycles which contributes to the difficulty that the industry and its regulators have in dealing with them.
Cycles and Crises in Property/Casualty Insurance

Causes and Implications for Public Policy

J. David Cummins*  
Scott E. Harrington**  
Robert W. Klein***

Editor's Note

At the Summer Meeting of the NAIC, the Executive Committee of that organization received an Executive Summary of a long-awaited research study of conditions that lead to recurring underwriting cycles and price/availability crises in the property/liability insurance business and their implications for insurance regulation.

The research was underwritten by substantial grants from the MacArthur Foundation and the National Association of Insurance Commissioners. It consisted of separate studies by research teams from the Universities of Pennsylvania and South Carolina.

* The views expressed herein do not necessarily reflect those of the National Association of Insurance Commissioners, the MacArthur Foundation, the Wharton School of Finance, or the University of South Carolina.

The Journal acknowledges with thanks the permission of the National Association of Insurance Commissioners to publish this Executive Summary.

** Harry L. Lomax Professor of Risk Management, Wharton School of Finance, University of Pennsylvania.

*** Professor of Insurance and Finance and Francis M. Hipp Distinguished Fellow, College of Business, University of South Carolina.

**** Director of Research, National Association of Insurance Commissioners.
augmented by a historical perspective on the cycle prepared by Stewart Economics.

It seems clear that the study will be cited for years to come by those in government and industry who hope to ameliorate these underwriting cycles. Many of our readers will want to read the report in detail when it becomes available. In the meantime, the journal presents in its entirety the Executive Summary (edited only to conform to this publication's style). As a convenience to readers we include as an Appendix a compilation of the references cited in the text.

Introduction

Few problems have generated as much pressure for regulatory and legislative action as the liability insurance "crisis" of the mid-1980s. Many professionals, businesses, nonprofit organizations, and governmental entities experienced significant increases in their liability insurance premiums while finding it more difficult to obtain coverage. As a result, these organizations were forced to increase their own prices and fees or reduce their activities. Some entities were unable to find coverage at any price and were forced to close down completely or go without insurance. Virtually everyone in society was adversely affected by these developments in one way or another. The resulting hue and cry led to legislative inquiries in many states. Policy responses took the form of increased regulation and data reporting requirements as well as tort reform.

The liability insurance crisis has been seen as a particularly severe manifestation of the more general phenomenon known as the "underwriting cycle." The property/casualty insurance industry is notorious for its pattern of rising and falling prices and profits, particularly in long-tail lines. As prices rise, insurers also tend to narrow coverage, tighten their underwriting standards, and withdraw from markets. Conversely, falling prices are accompanied by increased entry and expanded coverage. This pattern can be traced back to the industry's infancy. Cyclicality has played a significant role in the industry's evolution and the development of public policy towards the industry.

However, the premium hikes and supply cutbacks that occurred during the mid-1980s were much more severe than those that typically occur when the market hardens. The medical malpractice crisis
of the mid-1970s was another instance of price increases and reductions in coverage far exceeding the normal cyclical pattern. The particular severity of these recent crises in the context of a more general cyclical pattern in insurance prices, profits, and availability raise a number of questions about these phenomena and their relationship to each other. What are the respective causes of general cyclical movements in insurance prices and availability and more severe price/availability crises? Are price/availability crises simply a more severe manifestation of the underwriting cycle, or are they different phenomena caused by different forces? How should regulators and policymakers respond to these phenomena? Are there regulatory or legislative actions which would prevent or mitigate insurance cycles and crises?

These are important questions as developments stemming from the market conditions of the 1980s raise fundamental policy issues today about the structure and performance of the industry and its regulation. The increase in insurer failures following the soft market of the early 1980s has prompted strong congressional interest in the efficacy of solvency regulation by the states. The rate increases and limits on coverage occurring during the last hard market led to an antitrust suit by the attorneys general of 20 states, prompted expansion of the Federal Risk Retention Act, and renewed interest in repeal of the industry’s limited antitrust exemption under the McCarran-Ferguson Act. There also have been greater pressures to increase regulation of rates, limit insurers’ underwriting discretion, and institute alternative insurance mechanisms. Scrutiny of the insurance industry has increased rather than diminished in the years since the liability insurance crisis, and another severe hard market would surely further increase pressure for political solutions.

Unfortunately, some of the actions contemplated to address cycles and crises in insurance are not necessarily founded on a sound understanding of the economics of the industry. Indeed, our knowledge about the causes of the underwriting cycle and the implications for public policy has been inadequate. The conventional wisdom is that the cycle results from insurers’ tendency to engage in “cash-flow underwriting,” i.e., lowering rates and expanding coverage to increase premium and investment income or retain market share. This explanation fails to describe the complex environment in which insurers operate and the principles which guide their decisions. It also fails to offer meaningful insights into how regulation and other areas
of public policy might affect the market and the cycle, either posi-
tively or negatively. At the same time, regulators and other industry
observers witnessed substantial price cutting during the late 1970s
and early 1980s which seemed to go beyond what was justified by
higher interest rates. The academic literature has approached the
cycle more analytically but has fallen short of providing a complete
explanation sufficient to guide policymaking.

These outstanding issues were the impetus for the NAIC's de-
cision to fund, with assistance from the MacArthur Foundation, a
major research effort timed at gaining a better understanding of the
underwriting cycle end price/availability crises and their implica-
tions for insurance regulation. Separate studies were conducted by
research teams from the University of Pennsylvania and the Uni-
versity of South Carolina. Several important topics were addressed:
price shocks and capital flows, capacity and cyclicality, adverse se-
lection and equilibriums, risky probability distributions, and price
cutting in soft markets. A historical perspective on the cycle also
was developed by Stewart Economics. While not offering a definitive
or complete explanation of the underwriting cycle and price/avail-
ability crises, these studies advance our state of knowledge and pro-
vide a better foundation for guiding policy responses.

History of the Underwriting Cycle

It is important to understand the cycle as the product of economic
forces as well as certain institutional factors. It also is important to
study the cycle as it is reflected in the performance of the property/
casualty insurance industry generally as well as specific insurance
markets. Changes in the profitability of the insurance industry as a
whole reflect the combined results of interactions or cycles occur-
ing in various insurance markets. The characteristics of the cycle
have varied somewhat by line and over time. Some economic and
institutional variables affect all lines, but there are also factors par-
ticular to each line.

For a number of reasons, it is difficult to measure changes in the
actual price of insurance or in the amount of coverage provided. The
underwriting cycle is typically measured in terms of the rate of
growth in premiums and the combined ratio (the loss ratio plus the
expense ratio). The rate of premium growth increases when the mar-
ket harms and prices rise and decreases when the market softens and prices fall. However, premium growth will tend to underestimate the movement in prices because the "quantity" of insurance purchased (as measured by the amount of coverage or exposure) decreases when prices rise and increases when prices fall. Alternatively, the combined ratio serves somewhat as an inverse measure of price in that it shows the relationship between premiums earned and the amount of losses covered plus expenses. The combined ratio will decrease if premium growth exceeds the growth in losses and expenses and vice versa. However, the combined ratio also is based on calendar year accounting data. Movements in the combined ratio are affected by, but do not fully reflect, various developments in the marketplace that occur during the course of a cycle which are more difficult to quantify.

Traditional profit measures such as the combined ratio are misleading for other reasons as well. Premiums are inversely related to the level of interest rates because the competitive premium is the discounted present value of loss, expense, and tax cash flows. Thus, when interest rates rise (fall), other things held constant, premiums decline (rise) and the combined ratio can be expected to increase (decrease). But this does not necessarily mean that profits have declined (increased). Furthermore, combined ratios on longer tail lines are more responsive to interest rates than those on shorter tail lines because the discounting process covers a longer period of time for the longer tail lines. The overall operating ratio partially corrects for this problem by subtracting the ratio of investment earnings to premiums from the combined ratio. However, this ratio gives only an approximate indication of profitability because it does not adequately account for the timing of the relevant cash flows and ignores income taxes.1

A further problem is that reported revenues [earned premiums] represent an average of prices set over a two-year period. This averaging process plus lags inherent in the insurance business mean that accounting profits will exhibit a cycle even if actual prices charged to buyers do not. This illusory component of the underwriting cycle is known as the accounting cycle.

1. A better approach would be to compute the internal rate-of-return ("IRR") which has recently been proposed as a measure of profitability by one. This approach is discussed in Cummins (1990).
In this context, it is possible then to observe three different but related phenomena: 1) cycles in combined ratios or "accounting profits," 2) "real" changes in insurance prices, supply, and profit; and 3) severe price/availability crises. The "accounting cycle" is affected by the "real underwriting cycle," but they are not the same phenomenon. Similarly, severe changes in the price and availability of insurance will affect the combined ratio and accounting profits but are distinct from both the accounting cycle and the real underwriting cycle. Unfortunately, accurate and consistent data to systematically measure changes in insurance prices and availability over time are not readily available, particularly on a long-term historical basis. Hence, historical data on premium growth rates and combined ratios are presented with the caution that they are affected by real movements in insurance prices and availability as well as interest rates and other factors.

Figure 1 shows premium growth for the property/casualty industry as a whole for the years 1932–1990. Figure 2 shows the combined ratio before dividends for the property/casualty industry for the years 1926–1990. A cycle is apparent in both figures but it is most apparent in terms of the movement of the combined ratio. These figures reflect the accounting cycle as well, as "real" changes in price and the amount of coverage provided. Measuring from peak to peak, 10 distinct cycles in the combined ratio are observed for the period 1926–1984: 1926–1932, 1932–1940, 1940–1946, 1946–1951, 1951–1957, 1957–1964, 1964–1969, 1969–1975, and 1975–1984. We are currently in the midst of an 11th cycle with the market expected to harden in 1992.

In looking at these data it is important to note the impact of higher interest rates and increased investment income on insurance prices and the combined ratio. Net investment income increased from 6.3 percent of net premium earned in 1970 to 15.4 percent in 1984. Investment income subsequently fell to 12.7 percent in 1987 and then increased to 15.1 percent in 1989. For this reason, it is useful to look at the operating ratio which is equal to the combined
ratio minus the ratio of investment income earned on policyholder supplied funds to premiums earned. Figure 3 compares the combined ratio and the operating ratio for the years 1976–1989. The previous soft market does appear less severe in terms of the change in the operating ratio. The operating ratio increased only 15.4 percentage points from 91.8 percent in 1978 to 102.6 percent in 1984, compared to the 30.2 percentage point change in the combined ratio. While this movement in the operating ratio is still significant, the implication is that the impact of the cycle on insurers' bottom line is less severe when investment income is taken into consideration. However, it also is important to note that, during the last hard market, the operating ratio bottomed out at a much higher level, 95.6

3. Investment income here also is based on calendar year accounting dates and does not necessarily reflect insurers’ expected earnings on invested assets or the discount rate applicable in pricing a set of policies. Investment income, as reflected in the operating ratio, does not include realized and unrealized capital gains or investment income attributable to capital and surplus. The NAIC’s Report on Profitability: By Line By State includes realized capital gains and investment income attributable to capital and surplus in its calculation of total income.
percent, compared with 91.8 percent in the previous hard market. The change in the operating ratio would be even smaller if new money yields were used. Moreover, increases in the claims-tail and higher investment yields might explain the increase in the combined ratio between hard markets.

The significance of the accounting cycle also is apparent when we compare the property/casualty insurance industry's profitability against that of other industries over time. Figure 4 plots the property/casualty industry's rate of return on net worth against that of banks and the Fortune 500 industrial corporations for the period 1974–1989. It is apparent from Figure 4 that cyclical variation in the rate of return for the property/casualty insurance industry is much more severe than variation due to the general business cycle. For the entire

4. The comparative rate of return on net worth exclude unrealized capital gains. While these profit figures are useful in shedding light on cyclicality, from the theoretical and practical standpoint, unrealized capital gains should be included in the measurement of the long-run rate of return on equity in insurance or in any other industry.
1974–1989 period, the average absolute change in the property/casualty industry's rate-of-return from peak-to-trough and trough-to-peak was 15.8 percentage points, more than three times the average change in the Fortune 500's rate-of-return.

We can also see from Figure 4 that the cycle in insurance profits has moved somewhat independently of the general business cycle. In essence, just looking over this 15-year period, soft insurance markets have preceded declines in the national economy while hard insurance markets have lagged behind general economic recoveries. While it is reasonable to presume that interest rates and the overall economy affect the cycle in insurance profits, it also is clear that other forces are driving the insurance industry's performance over time.

In addition to the accounting data available on premiums and profitability, there are some data available which more directly reflect cyclical pricing in insurance. Figure 5 tracks the percentage total deviation below Insurance Services Office, Inc. ("ISO") advisory rates for general liability, commercial automobile, commercial
multi-peril and commercial fire and extended coverage, over the period 1982–1989. It is apparent from Figure 5 that deviations below ISO advisory rates increased substantially from 1981 through the end of 1983, as the market softened. After leveling off during 1984, deviations decreased significantly, as the market hardened, reaching their smallest level in mid-1986. Deviations increased once again after the middle of 1986 and continued to increase through the third quarter of 1989. Several studies also have documented changes in liability insurance prices and availability during the mid-1980s (GAO, 1988, and RIMS, 1989).

5. The total deviation below ISO advisory rates is the total deviation below ISO monoline manual rates for monoline policies and the total deviation below package rates for package policies. It should be pointed out that these data are only an approximation of pricing activity in these lines. Not all ISO companies and states are represented in these data and certain types of policies are also excluded. These policies include composite-rated, large blanket-rated, and difficult-to-rate risks. Consequently, these data will not be fully representative of pricing in lines such as general liability, which encompass a rated classes. No assumption is made here that ISO advisory rates are equal to competitive rates, but their relationship is not presumed to vary cyclically.
The above discussion indicates that some lines of insurance are more cyclical than others, both in terms of the length and amplitudes of their cyclical pricing patterns. An important reason for differences among lines is the length of the payout-tail. Competitive insurance prices reflect the discounted present value of losses, expenses, and taxes arising out of the insurance transaction. Lines with longer tails reflect larger discounts for the time value of money and thus are more heavily impacted by changes in interest rates. A significant portion of the changes in insurance prices and profits observed over the course of an underwriting cycle typically can be explained by changes in interest rates. However, interest rates do not seem to be an adequate explanation for all of the cyclical variation in pricing and particularly for some of the severe shocks in price and availability that have occurred over the past two decades.

Table 1 shows combined ratios for the various property/casualty lines for the years 1971–1990. These figures indicate that, in recent years, the cycle in the liability combined ratio has been particularly severe. However, the cycle also is apparent in other lines including...
## TABLE 1

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Notes:
- Source: NAIC Survey
- Calculated by author
property lines and personal lines. Also, the timing of the cycle is not uniform across lines.

Several important observations emerge from a review of historical data on the cycle. First, until the last decade, the cycle was fairly regular in length, approximately six years. More recently, the soft market phase of the cycle has lengthened while the hard market phase has not. Second, the movements in the combined ratio have become more severe in recent years, particularly in terms of the deterioration of profits when the market is soft. Third, during the last hard market, prices and profits did not bounce back to their level during the previous hard market before the market turned soft again. This could indicate a decline in the long-term profitability of the industry. Fourth, property/casualty insurance appears to be more cyclical than other industries and therefore, must be affected by factors peculiar to it. Fifth, each property/casualty line or market has its own cycle which varies somewhat. It is apparent that the cycle in any particular market is affected by general economic forces, factors common to all property/casualty insurance markets, and factors specific to that particular market. Finally, prior to 1983, personal lines tended to be more cyclical than commercial lines but this situation has reversed. The question is whether recent experience reflects specific price/availability crises caused by a particular sequence of events or whether there is a fundamental, long-term change in the dynamics of the cycle.

Prior Research

Prior academic research on underwriting cycles and “crises” in insurance markets primarily deals with two issues: 1) whether insurer operating results actually are cyclical; and 2) cyclical and non-cyclical causes of volatility in prices and in the availability of coverage. A number of studies focus specifically on causes of the commercial liability insurance crisis of the mid-1980s.

Empirical Evidence of Cycles

Previous studies provide statistical evidence that loss ratios and reported underwriting profit margins exhibit a cycle of about six years (Venezias, 1985; Cummins and Outreville, 1987; and Doherty and
Kang, 1988) ard that underwriting results remain cyclical after controlling for the expected effects of changes in interest rates (Fields and Venezian, 1989, and Smith, 1989). The results suggest that cyclicity in reported underwriting margins cannot simply be explained by the expected effect of changes in interest rates; i.e., that operating profits including investment income also are cyclical.

**Causes of Market Volatility**

**Cycles and Excessive Price Cutting.** Insurance industry analysts' traditional view of underwriting cycles emphasizes fluctuations in capacity to write coverage caused by changes in surplus and insurer expectations of profitability on new business (see Stewart, 1981; also see Berger, 1988). The essence of this explanation is that expectations of favorable profits lead to increases in supply, that competition then drives prices down to the point where underwriting losses deplete surplus, and that insurers ultimately constrain supply because of unfavorable profit expectations or in order to prevent financial collapse. Price increases then replenish surplus until price-cutting ensues again.

A key element in this explanation is that competition in soft markets ultimately leads to inadequate rates. Prior academic research includes little or no formal analysis of why competition could cause prices in soft markets to fall below levels needed to cover costs expected when policies are sold and to ensure insurer financial soundness. It has only been suggested that such a tendency might arise from differences in insurer expectations concerning the magnitude of future loss costs (McGee, 1986, and Harrington, 1988; also see the comments in Stewart, 1981), differences in insurer incentives for safe and sound operation (Harrington, 1988), or both.6

Instead, academic research has raised several questions concerning the traditional explanation of cycles. This research usually presumes that insurers behave rationally and thus questions why competition would lead them to cut prices to the point where premiums and anticipated investment income are insufficient to finance ex-

6. It has been argued that prices may periodically become inadequate due to industrywide use of suboptimal forecast methods (Venezian, 1983), but this argument is tantamount to claiming widespread irrationality on the part of insurers.
Predicted future claim costs. A persistent tendency for prices to fall too low in soft markets is inconsistent with standard economic models of competitive markets. Similarly, popular explanations of "cash flow underwriting" usually imply that insurers are irrational in that they reduce rates too much in response to increases in interest rates.

The emphasis on rationality in academic work is illustrated by research that considers whether cycles in reported underwriting results could be largely or even exclusively caused by financial reporting procedures and lags in price changes due to regulation (Cummins and Oteyville, 1987). This work shows conditions under which accounting and regulatory lags could generate a cycle in underwriting margins without either excessive price-cutting during soft markets or sharp reductions in supply following reductions in surplus. The authors note, however, that regulatory lag and financial reporting procedures are unlikely to explain large price fluctuations in the commercial liability insurance market in the mid-1980s.

More generally, skepticism of widespread insurer irrationality has led academic researchers to search for better or more complete explanations of cycles and rejections in surplus. They also have begun to explore why the flow of new capital into the industry following reductions in surplus may be insufficient to prevent short-run price increases in excess of increases in the cost of providing coverage.

Exogenous Shocks to Surplus and Hard Markets. Some research on the causes of the liability insurance crisis of the mid-1980s emphasizes the influence of rapid growth of expected claim costs, increased uncertainty over future claim costs, and declining interest rates. Each of these factors would be expected to cause break-even premium rates for insurers to rise regardless of any cyclical influences on prices. However, whether cost-related factors are capable of fully explaining the sharp premium increases in 1985–86 and in other hard markets has been questioned. Academic research has begun to investigate the possibility that large premium increases and availability problems in hard markets are influenced by insurer responses to negative shocks to surplus.

7. Similarly, Doherty and Kang (1988) essentially argue that cycles reflect slow but generally rational adjustment of premiums to changes in expected claim costs and interest rates, but the causes of the lags in adjustment are not explored.
that are largely beyond the control of insurers, such as a large unanticipated increase in claim costs for previously written liability policies, or as a result of natural disasters [Gron, 1989a, 1989b; also see Winter, 1988a, 1990]. If surplus increases only slowly and largely from earnings on new insurance sales following such a major shock, the supply of coverage could be expected to contract significantly following the shock. As a result, premiums could increase more than the amount implied by changes in the expected cost of coverage, and rationing of existing surplus could lead to availability problems for certain types of coverage and hazards. Surplus might adjust to shocks only slowly because capital markets could be uncertain about the effects of shocks on individual firms, federal tax laws may make temporary infusions of capital unattractive, and entry by new insurers might be slow.

This explanation predicts that reductions in surplus are likely to be associated with price increases. Previous empirical research provides some evidence to this effect (see Gron, 1989a; and Winter, 1990), but it has not yet been able to explain the commercial liability insurance crisis of the mid-1980s or other severe price/availability crises. Exogenous shocks with slow adjustment of surplus also cannot readily explain soft markets, which are characterized by several years of stable or falling premium rates.

**Effects of Regulation.** As noted earlier, the possibility exists that delays in the rate approval process could influence or even cause cyclical fluctuations in underwriting results [Cummings and Outre-ville, 1987]. Many studies analyze whether rate regulation is likely to amplify cyclical movements in statewide loss ratios [e.g., Witt and Miller, 1981; Outre-ville, 1990; Tennyson, 1991]. Most of these studies consider the hypothesis that regulatory lag will tend to increase loss ratios in hard markets by delaying rate increases and to reduce loss ratios in soft markets by delaying rate reductions. An alternative view, which has provided some motivation for the adoption of flexible rating laws, is that rate regulation may help to diminish cycles by

8. Industry analysts often note that capacity "crunches" tend to be associated with external events of this type (see Stewart, 1981).

9. See Harrington [1984] for a survey of early work on the effects of rate regulation on cycles and discussion of studies that consider whether rate regulation affects variability in loss ratios apart from any cyclical effects.
preventing excessive price-cutting in soft markets. Other research argues that rate regulation may have little effect on loss ratios for many commercial lines due to widespread use of schedule rating and other procedures that provide insurers with substantial flexibility in pricing even when rates are regulated (Stewart, 1987). Although some regulators dispute this argument.

The Liability Insurance Crisis

The commercial liability insurance crisis of the mid-1980s prompted numerous studies of the causes of premium growth and availability problems, including cyclical influences, and of changes in the Insurance Services Office, Inc. ("ISO") commercial liability insurance coverage form. Much of this research has emphasized the role of non-cyclical factors. Important policy issues addressed in this research include the possibility of collusion and the role of the insurance industry's limited antitrust exemption.

Some of the research discussed earlier implies that commercial liability insurance premium growth in the mid-1980s might have been aggravated by shocks to surplus in the form of unexpected growth in claim costs and thus loss reserves. A number of other studies argue that much of the growth in premiums and availability problems was caused by growth in the expected value and uncertainty of future liability claim costs rather than by cyclical influences. (Tort Policy Working Group, 1986; and Clarke, et al., 1988; also see Abs-Ham, 1988a). Several studies argue that increased uncertainty would be expected to lead to increases in prices needed to cover expected future costs including the cost of capital (e.g., Danzon, 1984; Clarke, et al., 1988; Winter, 1988a, 1990; and Cron, 1989b).

Rapid premium growth in general liability insurance was accompanied by rapid growth in reported losses for new business. Empirical analysis of this relationship suggests that a large portion of this premium growth can be explained by growth in expected losses and changes in interest rates (Harrington, 1988, and Harrington and Litzen, 1988). However, the analysis also suggests that premiums grew more slowly than implied by changes in interest rates and reported losses on new business during the early 1980s and more quickly than implied by such changes during 1985–86. Both results are consistent
with cyclical fluctuations in premiums, but the latter result also
might be explained by shocks to surplus from unexpected increases
in claim costs.

The Role of Reinsurance

Most academic research on insurance market volatility focuses on
the primary and reinsurance markets combined. A number of ob-
servers suggest that changes in reinsurance market capacity prior to
and during the liability insurance crisis may have had a significant
impact on financial results in the primary liability insurance market
(e.g., McGee, 1986; also see Gottheimer, 1986). A significant num-
ber of new reinsurers, including many alien reinsurers, entered the
United States market during the 1970s and early 1980s. A significant
number of these companies withdrew from the market during 1984–
1986. Like those for the primary market, financial results for the
reinsurance market deteriorated sharply during 1984–1985, but the
decline generally was worse for the reinsurance market. Despite
company exits, a significant amount of new capital entered the re-
insurance market during 1985–1986, as was the case for the primary
market.

Expansions and contractions in reinsurance market supply can be
expected to affect the primary market, especially the sale of excess
coverage. However, it has been argued that the similarity in per-
formance of the primary and reinsurance markets implies that vol-
atility in the reinsurance market is unlikely to be a major cause of
volatility in the primary market (Harrington, 1988). Instead, price
fluctuations in both the primary and reinsurance markets are likely
to reflect the same underlying causes, although the effects of unex-
pected changes in claim costs could be greater for reinsurers writing
excess layers of coverage than for primary insurers.

10. The study by Gottheimer (1986) provides detailed discussion of experience
in the United States reinsurance market prior to 1986. Also see Berger, Cummins and

11. See Berger, Cummins and Tennyson (1991) for discussion and for estima-
tion of a model of general liability insurance loss given designed to provide evidence
of such effects.
Coverage Changes

Proposed changes in the ISO commercial general liability insurance form during the mid-1980s to include a claims-made option and exclude coverage for virtually all pollution claims have led to substantial controversy. Research suggests that increased uncertainty in forecasting commercial liability claim costs, which cannot be greatly reduced through diversification by insurers, can increase the relative advantages of claims-made liability coverage compared to occurrence coverage and of contracts that involve some form of retroactive premium adjustment based on aggregate loss experience (see Danzon, 1984, 1985, ch. 6; Priest, 1989, and Dobbert and Dionne, 1989). Other research argues that increased uncertainty is likely to have increased adverse selection and that the introduction of claims-made coverage and the exclusion of pollution claims in basic liability coverage were efficient methods of separating low-risk and high-risk buyers (Priest, 1989). 12

Another aspect of uncertainty is the risk associated with the interpretation of insurance contract language. Some authors (e.g., Abraham, 1988b) argue that expansive court decisions concerning contract language contributed to availability problems in the market for environmental impairment liability coverage in the mid-1980s. Specifically, it is suggested that court interpretation of the policy provision in the comprehensive general liability policy that restricted coverage to "sudden and accidental" events as encompassing gradual pollution contributed to withdrawal of coverage and changes in the terms of the standard liability contract to exclude all pollution-related liability. 13

12. Expansion in tort law also may have aggravated adverse selection to the point where coverage became unavailable at any price for some risks (Priest, 1987). Whether liability insurance claim costs have actually become less predictable in recent years is not clear, based on the results of prior research. While the variability of loss ratios for general liability insurance increased during the 1980s compared to the 1970s (see Clark, et al. 1988), this result could largely reflect unanticipated increases in claim costs during the later period, as opposed to an ongoing increase in uncertainty.

13. It should be noted that other authors argue that insurers intended to cover gradual pollution when they originally included the "and accidental" clause (see Anderson, 1988).
The NAIC Underwriting Cycles Studies

Prior research on insurance markets suggests that the conventional underwriting cycle can be separated into three distinct but interrelated phenomena: 1) accounting cycles, which reveal little about pricing and profits in insurance markets; 2) real cycles or, more accurately, real changes in prices, profits, and the supply of insurance; and 3) price and availability crises brought on by fundamental changes in market conditions affecting certain types of coverage. The NAIC underwriting cycles studies presented in this report extend the prior literature by examining, in more detail, some of the key issues addressed by prior researchers and by introducing new topics and hypotheses.

The studies sponsored by the NAIC focus on periodic hard and soft markets and price/availability crises as distinguished from the "accounting cycle" in reported underwriting profits or combined ratios. Specifically, the NAIC underwriting cycles studies investigate two interrelated issues: 1) the existence and causes of real underwriting cycles, i.e., periodic hard and soft markets, and 2) the causes of price/availability crises. The overall project consists of five major studies.

Interest Rates, Financial Structure, and Price Cycles

Neil Doherty and James Garven analyze the interaction between interest rates, insurer capital structure, and insurance pricing as a possible cause of real underwriting cycles. This extends prior research by Doherty and Kang (1988). That paper addressed the issue of cash flow underwriting and pointed out that responsiveness of insurance prices to interest rates is the expected result in a market where the product consists of the promise to make payments over a period of time. This is because prices in competitive insurance markets would reflect the interest earnings on funds held between the premium payment and loss payment dates. Thus, prices should fall when interest rates rise and rise when interest rates fall. This is not a problem unless insurers overreact to interest rate changes or unless serious pricing errors are common.

Doherty and Garven make use of standard financial pricing models (see Cummins, 1990) to investigate the hypothesis that insurance
prices are inversely related to interest rates. Their principal innovation is the use of the financial concept of the duration of insurer assets, liabilities, and equity. Duration is a measure of the rate of change of the value of a financial instrument attributable to changes in interest rates. For example, it is well-known that bonds have a positive duration, implying that an increase in interest rates reduces the market value of a bond. The larger the duration, the larger is the change in the value of the bond corresponding to a given change in the interest rate.

Both bonds and other assets and insurer liabilities have positive durations; i.e., their values decline when interest rates rise. Since interest-rate changes affect insurer assets and liabilities in the same direction, the net effect on equity is uncertain. Doherty and Garven provide evidence that insurer-equity durations are positive, i.e., the market value of equity falls (rises) when interest rates rise (fall). Thus, changes in interest rates affect the price of insurance not only through the discounting process but also by changing the insurer’s capital structure. However, insurer response to rising and falling interest rates is hypothesized to be asymmetric. Because it is easier to pay dividends if capital is too high than to raise capital when capital is too low, insurers should be more responsive to falling interest rates than to rising interest rates.

For example, suppose that interest rates increase. If capital structure and, therefore, insurer safety levels are unaffected, Doherty and Garven point out that insurance prices should decline by precisely the amounts predicted by standard insurance-pricing models that compute price as the present value of losses, expenses, and taxes. However, an increase in interest rates does affect capital structure for nearly all property/casualty insurers. Specifically, such an increase reduces the market value of equity. In a perfect capital market, this would create no pricing problems, because new capital would flow in instantaneously to make up the deficit as long as product prices also adjust to provide a fair rate of return. They hypothesize that transactions costs, i.e., impediments to the free flow of capital, are present that prevent capital from adjusting immediately following a change in interest rates. Thus, they predict smaller price increases than would be indicated by standard insurance pricing-mod-

14. It is more correct technically to say that duration measures the responsiveness of the bond value to the discount factor, $1 + r$, where $r$ = the interest rate.
els when interest rates fall and smaller price-declines when interest rates rise.

The responsiveness of insurers to changing interest rates also depends upon their access to the capital markets. Thus, stock companies should respond more rapidly and completely to interest-rate changes than mutuals. Large firms and firms with better access to reinsurance also should be relatively more responsive to interest rate changes. Doherty and Garven provide empirical evidence consistent with these hypotheses.

In terms of real cycles, the Doherty-Garven results imply that interest rate changes coupled with changes in equity values may serve as the triggering mechanism shifting the market between hard and soft periods. In terms of the 1984–1985 crisis, their results suggest that liability insurance prices would have responded relatively strongly to the decline in interest rates during that period because of the asymmetry in insurer response to falling and rising interest rates. On the other hand prices would be under-responsive to rising interest rates, i.e., one would not predict that cash flow underwriting would be associated with underpricing during periods of rising rates. Their results also suggest an increase in price due to capital shocks from other causes such as catastrophes and changing liability rules, especially for firms that have relatively limited access to the capital markets and to reinsurance.

**Price Shocks and Capital Flows**

The study by J. David Cummins and Patricia Danzon focuses primarily on the 1984–1985 price/availability crisis in general liability insurance. However, their results also have implications for real underwriting cycles. Hard and soft markets may be explicable in terms of milder recurrences of the same type of phenomena that caused the crisis. Cummins and Danzon explain crises in terms of unexpected shocks to losses or assets that deplete capital, triggering the need to raise new equity to remedy the capital shortage.

As mentioned above, standard insurance-pricing models (see Cummins, 1990), the price of property/casualty insurance is the present (discounted) value of expected losses, expenses, and taxes.¹⁵

¹⁵ The discount rate reflects the current level of market interest rates as well as a risk adjustment to provide the insurer's profit margin.
Cummins and Danzon first investigate whether the aggregate price increase in general liability insurance from 1984–1986 can be explained in terms of underlying cost factors (see also Harrington, 1988) such as an increase in expected losses coupled with the decline in interest rates that took place in the mid-1980s. After accounting for these factors, they conclude that a significant component of the 1984–1986 increase in general liability prices remains unexplained by the standard pricing models. To explain this component, Cummins and Danzon formulate and test a new hypothesis concerning the relationship between loss shocks, insurer leverage ratios, and flows of new capital into the industry.

Cummins and Danzon hypothesize that insurers have target leverage ratios or safety levels. For example, firms rated A+ by the A.M. Best Company or other rating services have established reputations for being in the highest safety class and will take the steps necessary to remain in this class. Such firms serve buyers who have a preference for relatively safe insurance. Firms in lower quality classes for the most part are there by design, serving buyers who prefer more risky insurance at a lower price.

Suppose that a loss shock occurs that dislodges an insurer from its preferred quality class. For example, a change in liability rules may increase the company’s expected loss liability for unsettled losses under prior policies (i.e., loss reserves) as well as loss expectations on future policies. The increase in liabilities on old policies affects the firm’s safety level even if it can raise prices on new policies because it increases the firm’s liabilities relative to its equity.

Suppose further that the firm would like to return to its previous quality level by raising the level of equity relative to liabilities. Cummins and Danzon show that the firm cannot do this merely by raising new equity capital, because part of the new capital will be drawn down to pay old liabilities. New equity holders will refuse to provide capital under these conditions, because it will be reduced in value once it enters the insurer. Intuitively, this occurs because the old liability holders benefit from the increased level of safety without paying anything for the increase. The fact that new policyholders will be paying premiums that reflect the higher safety level does not

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16. Beginning in 1987, prices were also affected by the Tax Reform Act of 1986, which raised the effective federal income tax rate on property/casualty insurers.
remove the penalty to equity, which is over and above the decline in equity that has already occurred due to the change in loss liabilities. The only way to avoid the penalty associated with a return to the target safety level is to charge premiums to new policyholders that are higher than the premiums they would pay in a competitive market based on loss expectations, interest rates, and other cost factors. Thus, especially large price increases are to be expected following an adverse loss shock that increases the value of loss reserves. This assumes that such price increases will receive regulatory approval which often may not be the case to the extent that they are intended to recoup prior losses.

If premiums are above the competitive level following a shock, it does not mean that equity holders are earning a higher-than-competitive-fair-return. The difference between the premium paid and the fair competitive premium pays for the increase in the economic value of the existing liabilities on prior policies resulting from the strengthening of the firm's financial position. The firm's equity owners do not receive a windfall return.17 If premiums were not above the competitive level following the shock, equity holders would be penalized (receive less than a fair return) if they attempted to improve the firm's safety position by contributing new capital.

Cummins and Danzon hypothesize that existing insurers, particularly those in the higher-quality classes, are able to raise prices under these circumstances because they hold private information about their customers. Insurers gain this private information because they accumulate both subjective and objective data about policyholders by insuring them over a period of time. If the policyholders go back into the market to seek insurance from an alternative company, much of the private information is lost. Policyholders with favorable risk characteristics may be charged a higher price in the open market because other carriers do not have as much information on their risk characteristics as their present insurer. Thus, they may be willing to sustain a price increase without switching. They also are willing to pay the higher price because strengthening the insurer

17. That is, if the difference between the premium charged and the fair competitive premium equals the increase in value of the prior liabilities, the economic market value of the firm's equity following the equity/policy issue is equal to the value of the equity before the equity/policy issue plus the amount of new capital contributed. This is one definition of the fair rate of return.
also increases the economic value of their coverage for losses reflected in the loss reserves.

Cummins and Danzon provide empirical evidence supporting their hypothesis as an explanation for the 1984–1985 liability crisis. Loss expectations increased significantly in the period 1983–1985. These changes led insurers to strengthen loss reserves, indicating that the altered loss expectations applied retroactively as well as prospectively. Insurers also experienced a significant deterioration in safety levels during this period. As a result, prices were increased substantially in 1985–1986, providing a signal to the capital markets that new equity would not be penalized, and new capital flowed into the industry. In fact, the years 1984–1986 were the only years during the period 1976–1989 when insurers experienced net positive inflows of new capital.

Regression results provide further support for the hypotheses that safer insurers command higher prices and that loss reserve strengthening is accompanied by increases in equity. Thus, at least in the aggregate, the 1984–1985 crisis can be explained in terms of the following factors: 1) declines in interest rates, 2) increased loss expectations on new policies, 3) retroactive rule changes increasing loss liabilities on old policies, and 4) reserve strengthening accompanied by inflows of new capital. These findings suggest that insurer behavior during the crisis period was a rational response to changing market conditions. They also suggest that regulatory limits on price changes would aggravate availability problems and delay the market’s return to normal safety levels.

Price Cutting in Liability Insurance Markets

Prior to the 1984–1985 liability crisis, there were widespread reports in the insurance and general financial press of earthshaking price competition among insurers. Insurers were alleged to be pricing below cost in order to obtain funds to invest (so-called cash flow underwriting). In part, this was attributed to entry into the insurance and reinsurance markets of inexperienced or “naïve” firms, including captive insurance companies and new reinsurers. The result was “excessive” price competition, leading to large underwriting losses that sparked the 1984–1985 crisis.

Scott Harrington and Patricia Danzon present the results of a theoretical and empirical analysis of potential price cutting in in-
surance markets during the early 1980s. They explore two primary factors that may have contributed to excessive price cutting: 1) differences in insurer expectations regarding future loss costs, and 2) excessive risk-taking by some firms in the industry. Harrington and Danzon hypothesize that firms form estimates or expectations of future losses on the basis of public and private information. Public information includes general economic data as well as pooled data provided by rating organizations such as the ISO. Private information consists of the firm's own data base as well as the knowledge and experience of its personnel. Loss expectations are hypothesized to be formed as a weighted average of public and private loss estimates. This suggests, among other things, that insurer pricing errors will be correlated because they all rely to some degree on the same public information. It also implies that more accurate public information can reduce estimation error and help to stabilize insurance markets.

Harrington and Danzon hypothesize that insurer loss expectations are rational in the sense that they are correct on the average. However, in any given period some insurers will estimate too low and others too high. In a competitive market, the insurers whose estimates are too low in any given period will gain market share at the expense of insurers whose loss estimates are too high. However, because their loss estimates are too low, the “winning” firms will incur excessive underwriting losses and fail to earn a fair return on equity. This problem, which is well known in economics, is called the “winner’s curse.”

Economists have developed pricing (bidding) strategies to help firms avoid the winner’s curse. However, even if most insurers are aware of the winner’s curse and adopt optimal bidding strategies, problems can still develop in insurance markets if some firms take excessive risk. For example, new or inexperienced firms are likely to have higher forecast errors and may be unaware of the winner’s curse or unable to formulate optimal bidding strategies because of their inexperience. Other firms may engage in excessive risk taking, including “go-for-broke” behavior. Harrington and Danzon postulate that excessive risk taking is more likely among firms that have low levels of intangible capital, defined as the firm’s reputation for quality and its possession of a profitable book of renewal business. Established firms with high levels of intangible capital may decide to cut price below levels dictated by optimal bidding strategies in order
to avoid loss of business to firms which set prices too low due to
inexperience or intentional risk taking. This may exacerbate pricing
errors and contribute to the development of a price/availability cri-
sis.

Harrington and Danson conduct empirical tests to determine
whether the winner’s curse or excessive risk taking contributed to
the liability crisis. Their strongest conclusion is that substantial
shifts in liability insurance loss distributions occurred in the early
1980s that were not foreseen by insurers and reinsurers. Thus, un-
anticipated inflation was a major factor in causing the crisis. Firms
with larger estimation errors, as measured by ex post loss develop-
ment, grew faster than firms with smaller errors, providing some
support for the winner’s curse and excessive risk taking hypothesis.
Evidence is also presented that reinsurance is used by firms to facil-
itate rapid growth, although this practice is not necessarily associ-
ated with excessive risk taking.

The difficulty in identifying statistically significant undemoci-
ing prior to the 1984–1986 crisis implies that it would be even more
difficult to prove statistically the existence of real underwriting cy-
cles in more normal periods. However, the winner’s curse and risk
taking hypothesis may nonetheless help to explain pricing behavior
that characterizes a soft market. An important implication is that
improved monitoring of insurance pricing practices, if possible,
might assist efforts to mitigate future cycles and/or crises.

Adverse Selection and Market Equilibrium

One of the central results of the economic theory of insurance is the
adverse selection can lead to market failure. The classic paper on
this topic is by Rothschild and Stiglitz (1976). They hypothesize an
insurance market where there are two types of buyers: high risks
and low risks. Both risk types are exposed to a loss of the same amount,
but high risks have a larger loss probability than low risks.16 Buyers
know their risk class and also their loss probabilities. However, in-
formation in the market is asymmetric: insurers cannot identify high
and low risks who apply for coverage, although they do know the

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16. The model assumes that losses are bet{e{ally distributed, i.e. each individ-
ual will have at most one loss in any given period. The loss amount is assumed to be
a known constant.
loss probability of buyers in each group. A fundamental result of Rothschild and Stiglitz is that insurers may not be able to solve the information asymmetry problem by charging all applicants an average (or pooled) price. If they charge a pooled price and behave myopically, i.e., if they do not foresee their competitors' responses to their policy offers, the market will fail. Market failure implies that insurance is unavailable. Insurers may be able to solve the asymmetric information problem by offering two policies—a policy with full coverage at a premium rate equal to the high-risks' loss probability and a policy with partial coverage at premium rate equal to the low-risks' loss probability. If the coverage amount in the low-risks' policy is sufficiently small, this policy will not be attractive to the high-risks. The high-risks' policy will not be attractive to the low-risks because the premium rate is too high. Under these circumstances a market: equilibrium, called a separating equilibrium, will occur. Since the equilibrium involves partial coverage for the low risks, it is less desirable than a full-information equilibrium; i.e., an equilibrium where insurers are able to identify high and low risks.

Lawrence Berger and J. David Cummins extended the Rothschild-Stiglitz model to consider cases that provide a more realistic description of property/casualty insurance markets. Specifically, they investigate a market where insurers can identify buyers in terms of their expected losses but cannot distinguish among buyers on the basis of risk. They assume that insurers classify buyers for rating purposes on the basis of the known expected values of loss. Within any given class, buyers are characterized by a mean-preserving spread, i.e., buyers in each class have the same mean but may have different risk. They investigate the case where there are two types of buyers within each classification, high-risks and low-risks.

19. The loss probability for a pooled price policy is the weighted average of the high-risks' and low-risks' loss probability, with weights equal to the proportion of each type of risk in the total population.

20. Subsequent research (e.g., Wilson, 1977) investigated other types of firm behavior, e.g., some researchers assume that firms foresee competitors' responses to their policy offers. With some types of firm foresight, a pooling equilibrium may exist.

21. The term "risk" refers to the dispersion of the probability of loss distribution. The loss distribution has an expected value, which is the expected or average amount of loss for a given period. However, because losses are random, actual realized losses may be higher or lower than the expected amount. It losses are likely
One important finding concerning insurance markets characterized by mean-preserving spreads has to do with the effect of deductibles and policy limits. Consider two applicants with the same expected value of loss but different risk. Berger and Cummins show that deductibles tend to penalize the low-risks more than the high-risks because more of the loss expectation for low risks is concentrated at the lower loss levels. On the other hand, policy limits penalize high-risks more than low-risks because high-risks tend to have more loss expectation at the high loss levels. Thus, when faced with uncertainty regarding the risk of loss distributions, it would be rational for insurers to reduce policy limits because this would penalize high-risks more than low-risks and may induce high-risks to drop out of the pool. However, it would not be rational for insurers to utilize deductibles because deductibles penalize low-risks more than high-risks, and thus raising deductibles may induce adverse selection. The finding with regard to policy limits may help to explain the reductions in coverage limits during the 1984-1985 liability crisis.

Berger and Cummins also examine market equilibrium in a market characterized by mean-preserving spreads. They assume that insurers behave as if they were averse to risk, because of the effects of higher risk on ruin probabilities and hence on the value of firm to its owners. If insurers are averse to risk, several types of separating equilibria can develop in insurance markets. One possibility is a Rothschild-Stiglitz-type equilibrium where the high-risks receive optimal coverage and the low-risks receive partial coverage. However, equilibria also can occur where low-risks receive optimal coverage and high-risks receive partial coverage or where low-risks receive optimal coverage and high-risks are forced to buy a higher amount of coverage than their desired optimum. If the difference in risk between the high-risks and low-risks is sufficiently large, an equilibrium emerges where both types of risk receive optimal coverage.

to illustrate only within a relatively narrow region around the expected value, the loss distribution is said to be characterized by low risk. However, if losses can deviate from the expected value by large amounts and if these large deviations have a relatively high probability, then the distribution is said to be of high risk. In these expected losses (also called the means) of the two loss distributions are the same but the risk differs, the distributions are said to be characterized by a mean-preserving spread.
When insurers are risk averse, optimal coverage is not full coverage, because insurance will not be offered at actuarially fair rates. In this type of market, increases in insurer risk aversion can lead to coverage reductions accompanied by price increases. Insurer risk aversion may increase because of uncertainty regarding the loss distribution, depletion of capital, or from other causes. Thus, the Berger-Cummins analysis predicts behavior very similar to that observed during the 1984-1985 liability crisis, with rapidly shifting policy offers involving lower limits and higher prices and/or policy offers that buyers consider suboptimal. Such offers, in this sense, are completely rational in a market characterized by mean-preserving spreads and risk averse insurers.

Risky Probability Distributions and Liability Insurance Pricing

The studies by Cummins and Danzon and Harrington and Danzon point to shifts in the probability of loss distribution as a potentially important cause of the 1984-1985 liability crisis. However, because of limitations on data availability, those studies focused on loss aggregates rather than individual losses. To better identify trends in probability of loss distributions, J. David Cummins and James McDonald examined individual products liability occurrence data provided by the ISO.

The objective of the Cummins-McDonald study was to test for shifts both in expected losses-per-occurrence and in the risk of the probability of loss distribution. Both types of changes are potential causes of instability in liability insurance markets.

The ISO data consists of approximately 390,000 occurrences covering accident years 1973 through 1985. The data were for severity of loss only. Cummins and McDonald modeled this data by fitting probability distributions from the family of distributions known as

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22. Economists refer to insurance premiums that are equal to the expected value of the loss as "actuarially fair" premiums. Actuarially fair premiums play an important role in the economic theory of insurance. However, like perfect competition, actuarial fairness is an objective that is rarely achieved in practice, because all types of insurance incur transaction costs, expenses, and require profit loading. Thus, rates for real-world policies exceed expected losses and thus are not actuarially fair. "Fairness" in this context is not intended to be a judgmental term because it is regarded as fair for the insurer to recover its expenses and earn a reasonable profit.
the Generalized Beta of Type II ("GB2"). Data were fitted separately to each cell of the occurrence settlement triangle. For example, for a-cident year 1973, separate severity of loss distributions were estimated for occurrences settled in 1974, 1975, 1976, etc. Probability distributions were estimated for a total of 119 cells of the products liability run-off matrix. The distributions providing the best description of the data were the Burr II, the Burr III, and the GB2.

The results indicate that both the expected values and risk of products liability severity increased significantly over the sample period. The estimated severity distributions had infinite means in 72 of 119 cases. This implies that, without a policy limit, the insurer's expected loss would be infinite. The variances were also infinite for nearly all of the estimated severity distributions. Thus, policy limits are needed in products liability in order for coverage to be feasible, and changes in probability distributions may induce insurers to reduce policy limits, to raise prices for policies with existing limits, or both.

The probability of loss distributions also became much more risky over the period studied, with a higher likelihood of large losses. One measure of the riskiness of loss distributions is the maximum probable loss ("MPL"), which is the loss amount that is likely to be exceeded only rarely. To illustrate the changes in loss distributions over the study period, Cummins and McDonald estimated the MPL at the 99th percentile. The probability that any given claim will exceed this loss amount is only one percent. Maximum probable losses increased considerably over the period studied. For example, in 1962, the 99th percentile MPL for claims settled during the second run-off year was $98,339. By 1985, this had increased to $100,544. At runoff lag 3, the MPL in 1981 was $268,715 and had increased to $453,810 by 1984. These are illustrative of change in the MPL at other lags/lengths during the period of the early to mid-1980s.

The conclusion is that both the expected value and the risk of products liability loss distributions increased substantially during the period 1973–1985, with very significant increases during the 1980s. In this type of environment, it would be rational for insurers to raise prices and in some cases to lower policy limits. This is additional evidence suggesting that changes in cost factors are primarily responsible for the price and availability problems for products liability insurance during the 1980s.
Overall Summary

Insurance is a mechanism for redistributing losses. In some types of insurance, such as liability insurance, the payment of losses covers a long period of time following the policy coverage period. Lengthy payout periods imply that losses must be discounted when setting prices to reflect the time value of money. Estimation error also increases disproportionately as payout periods become longer. In liability insurance, this means that interest rates and loss uncertainty play major roles in determining price.

The studies by Cummins and Danzon and Doherty and Garven strongly support the conclusion that interest rates play a major role in insurance pricing. Thus, a large part of the price reductions in the early 1980s were attributable to rising interest rates, and a significant share of the price increases in 1984–1986 were attributable to the sharp decline in interest rates during this period. This responsiveness of insurance prices to interest rates is often termed cash flow underwriting. Changing insurance prices in response to changes in interest rates is appropriate in a competitive insurance market. Thus, interest rate responsiveness should not be viewed as an adverse phenomenon unless insurers overreact to interest rate changes. Contrary to the view of some observers, both the Cummins-Danzon and Doherty-Garven papers imply that insurers did not overreact, at least in terms of the aggregates, during the 1984–1985 crisis.

Cummins and Danzon also hypothesize that large loss shocks in the years preceding the crisis induced insurers to strengthen loss reserves. In order to raise capital to restore safety levels, reserve strengthening was accompanied by price increases that were higher than might have been expected on the basis of interest rates and loss expectations alone. In part, this was a charge to existing policyholders for the improved safety levels accompanying the inflows of capital that occurred in 1985 and 1986. According to Cummins and Danzon, unless equity owners are to be penalized, higher-than-competitive prices following a shock appear to be the only mechanism for restoring insurer safety levels over a relatively short time horizon. Their model implies that, if equity owners sustain losses because regulation limits rate increases, the ultimate result will be the withdrawal of capital from insurance markets and a worsening of any existing availability problems. This assumes that insurer rate
increases are not excessive or unwarranted in relation to changes in expected losses.

The Harrington and Danzon study provides further evidence that unexpected shifts in the loss distributions led to the underwriting losses that helped trigger the liability insurance crisis. They also investigate underpricing and excessive risk taking as potential causes of the crisis. Underpricing would be expected if the industry were affected by the winner’s curse, whereby firms whose loss estimates are relatively low tend to gain market share. Underpricing might also be initiated by naive firms or firms adopting go-for-broke strategies because of low levels of intangible capital. Although they find some evidence of underpricing and excessive risk taking, their research suggests that these factors were much less important than loss estimation errors as determinants of the crisis.

The Berger-Cummins and Cummins-McDonald studies provide information on the possible causes of changing policy offers during an insurance market crisis. If insurers cannot distinguish between buyers on the basis of risk or if insurer risk aversion changes, say, because of a capital shock, drastic and seemingly irrational changes in prices and policy limits may occur. For example, prices may increase at the same time that coverage decreases. Such changes may be a rational response to an uncertain market environment. Cummins and McDonald show that the market environment did become more uncertain during the years preceding the crisis. Products liability loss expectations and distributional risk both increased significantly. This provides further evidence that cost and risk factors, along with interest rate changes and the need for new capital, played major roles in triggering the liability insurance crisis.

Overall, the studies show that real underwriting cycles may be caused by some or all of the following factors:

1. Adverse Loss Shocks. Adverse loss shocks that move insurers away from their target leverage ratios may be followed by supra-competitive prices as insurers strive to restore target safety levels. However, during “normal periods,” i.e., where loss shocks are not severe, insurers may continue to price competitively and rely on retained earnings to restore target safety levels. Thus, it is the unusually large loss shock or an accumulation of smaller loss shocks that may lead to supra-competitive prices.
2. Changes in Interest Rates. Interest rates should be directly reflected in prices through the discounting process that is implicit in competitive insurance markets and indirectly affect price through their impact on insurer capital structure.


Price/availability crises may be caused by unusually large loss shocks, extreme underpricing, and/or significant changes in interest rates and stock prices. However, they may also be caused by instability in the underlying loss processes. Such instability may lead to drastic changes in insurer policy [price/quantity] offers that represent a rational response to a risky market. Dramatic increases in expected loss costs and the risk of loss distributions also can trigger pronounced changes in price that are made more severe if these changes also deplete capital.

Policy Implications

The main conclusion of the research on the underwriting cycle and price/availability crises is that they are phenomena primarily caused by forces-loss shocks and interest rates-that are not subject to direct regulatory or insurer control. Yet, when insurance markets harden and rates increase, regulators are called upon to stem the tide. It is difficult for the public to understand why rates cannot simply be frozen by flat and insurers ordered to provide coverage. Public perceptions are important because they can force or reward political responses which can ultimately make matters worse rather than better. Policy actions to address cyclical pricing and periodic price/availability crises must be approached carefully and realistically if they are to benefit consumers and society as a whole.

Although shifts in insurance prices and availability cannot be fully prevented by regulation, there are certain things government might do to lessen their severity and moderate the cycle. There are also certain policy responses which may not be helpful. The prior research on the cycle and the NAIC studies have implications for several different policy areas.
Rate Regulation

The liability crisis prompted a number of states to adopt “flex-rating” systems or re-institute prior approval rate regulation. The intended objective of these measures was to exert greater regulatory control over insurance prices and reduce their volatility. The question is whether rate regulation can really improve the market’s performance in this instance or possibly hurt it. If regulators operated in a political vacuum, possessed perfect foresight as to insurers’ future costs, and could adjust rates instantaneously to match shifts in expected costs, they could preserve optimal prices, presumably.

However, the reality is that neither insurers nor regulators have perfect foresight nor can rates be adjusted instantaneously to meet changed circumstances. Rather, regulators are subject to the same, if not greater, informational limitations as insurers. Mismatches between prices and costs due to regulation or market failures result in market dislocations and ultimately hurt consumers. Costs are incurred if rates are held either above or below the competitive level. If rates are set too high, consumers will purchase less insurance than insurers are willing to provide and pay more for that insurance than necessary. Conversely, if rates are set too low, insurers will sell less insurance than consumers are willing to purchase and availability will suffer. Conceptually, strict prior approval is the most intensive rate regulatory approach and requires the greatest precision and resources to ensure that prices match changes in costs. Under the typical file/use or use/file approach, regulators tend to rely on the market to govern rates.23 Alternatively, flex-rating seeks to allow market forces to determine rates between certain hards or parameters. Typically, under a flex rating system, rate changes are not subject to prior approval unless their absolute value exceeds a certain percentage (e.g., 25 percent). Currently, seven states have some form of flex-rating system for at least some lines.24

23 In practice, insurance departments apply these types of regulatory systems in different ways so these statements may not always hold. Procedurally, it could require more resources to retroactively disapprove a rate filing in a file/use system than to proactively disapprove a rate filing under prior approval.
24 The states are Minnesota, Missouri, New York, Oklahoma, Oregon, Vermont, and Washington. For a description of New York’s flex rating system, see Dina and Kistern (1987).
Flex-rating requires less regulatory precision and allows the market some leeway in adjusting to changing conditions, reducing the incidence of time lags between cost changes and rate changes. However, there is no escaping the inevitable trade-off between the potential costs imposed by regulatory control and the costs of cyclical pricing due to naive behavior or excessive risk taking. Tighter flex-rating bands can reduce pricing volatility but, depending on how they are applied, they might also increase the likelihood of market dislocations. Conversely, wider bands reduce the chance of market distortions but also allow greater swings in prices due to insurer naiveté and excessive risk taking.

Consequently, rate regulation should be approached cautiously as a means to control cyclical pricing. The effectiveness of prior approval or flex-rating systems in controlling cyclical pricing and improving market performance is continuing to be tested. Such systems could be helpful in mitigating cyclical pricing but their misapplication also could have negative effects on the marketplace. Alternatively, states might consider the establishment of competitive rating systems where appropriate. The insurance commissioner can retain some regulatory authority under a competitive rating system through file and use or use and file requirements. These requirements, coupled with close monitoring by regulatory analysts, would allow the commissioner to step in and force insurers to adjust their rates if they were clearly underpricing or overpricing their policies. At the same time, competitive rating would allow the market to function more spontaneously and reduce the time lag between cost changes and rate changes.

However, some regulators believe strongly that prior approval or flex-rating systems can be used effectively to prevent or mitigate underpricing in soft markets as well as excessive prices in hard markets. It is possible that a prior approval or flex-rating system, administered carefully and adequately staffed, could improve market performance in lines subject to underpricing due to excessive risk taking or naive behavior. Every effort should be made to expedite the processing and approval of rate filings to reduce regulatory lag. There should be at least equal attention given to rate inadequacy as well as excessiveness and political pressure to hold rates below costs must be strongly resisted. Ultimately, rate regulatory and solvency objectives must be coordinated.
Antitrust

Antitrust is closely related to rate regulatory issues in insurance. The basic principle underlying antitrust policy is to preserve and promote competition in the marketplace. The McCarran-Ferguson Act (1945) exempts the business of insurance from the federal antitrust acts to the extent that it is regulated by the states. The exemption does not apply to any agreement to boycott, coerce, or intimidate, or act of boycott, coercion or intimidation. Approximately half of the state antitrust statutes contain similar exemptions for insurance. The McCarran Act has been interpreted to allow a fairly wide range of collective activities among insurers, under the general supervision of state regulatory authorities, including data collection, advisory or bureau rates, and standard policy forms. Consumer groups and others have criticized the McCarran-Ferguson exemption and the insurance industry's collective pricing activity. These critics argue that McCarran repeal would promote greater competition and efficiency and limit price increases and supply cutbacks during hard markets (Angoff, 1988).

There have been numerous unsuccessful attempts in the past to repeal or substantially modify McCarran but now momentum seems to be building for some kind of change. H.R. 9, sponsored by Representative Jack Brooks (D-Texas), and S. 430, sponsored by Senator Howard Metzenbaum (D-Ohio), would permit the federal antitrust laws and parts of the Federal Trade Commission Act to apply to insurance in the instances of: 1) price fixing; 2) monopolization; 3) allocation of territories; and 4) unlawful tying practices. Both bills also allow insurers to continue to share "historical" loss costs which include adjustments for loss development but not trend. Advisory rates and "prospective" loss costs, including adjustments for trend, would not be protected from antitrust scrutiny.

The introduction of these bills was preceded by the NAIC's recommendation in 1989 to end advisory rates in favor of a "loss cost" system under which advisory/rating organizations compile and distribute prospective loss costs only. At the same time, the ISO announced that it would voluntarily discontinue advisory rate filings, where permitted, by 1992.

Given the "voluntary" phase-out of advisory rates and the present construction of the federal bills, a key area of discussion will be the application of antitrust policy to trending by advisory/rating or-
organizations. McCarran repeal proponents have argued that advisory/rating organizations should not be allowed to provide trend indications. Their concern is that advisory trend factors will be inflated and could help the industry sustain supra-competitive prices during hard markets. Trend is an important component of insurance rates and advisory trend information could assist insurers in coordinating their pricing strategies. However, other factors would work against a noncompetitive result. The lack of concentration and low barriers to entry and exit in most insurance markets would undermine efforts to adhere to supra-competitive rates based on inflated advisory trend estimates. In addition, the ability of insurers to apply different trend projections or otherwise modify the advisory loss cost indications or file their own loss costs as well as make other pricing adjustments would make adherence to a common rate difficult. Prior research on the effect of advisory organizations on market behavior in auto insurance tends to support this view (Danzon, 1983; Eisenach, 1985).

Also, advisory/rating organizations offer certain efficiencies which would be foregone if they were prohibited from performing trend analysis. The larger the database, the more reliable are the development and trend indications which can be produced from it. Advisory/rating organizations also can consolidate actuarial, economic, and legal expertise to develop and refine these indications. Alternatively, insurers would be required to increase their own actuarial staff or purchase actuarial consulting services, increasing their costs. Small- and medium-sized carriers may find this particularly burdensome and could withdraw from certain markets or merge with other insurers, resulting in higher concentration and possibly higher prices to consumers. Most importantly, the unavailability of advisory trend analysis could increase market instability by causing greater uncertainty about future claim costs and increasing the likelihood of pricing errors.

Still, there is some uncertainty about the ultimate value of joint trending information. Economies of scale are much more significant for compiling historical loss data than trend analysis. It is possible that more individual trending by insurers could lead to innovations in predicting claim costs that might ultimately contribute to more stable pricing.

In sum, there is no assurance that subjecting joint trending to antitrust would provide any tangible benefits in terms of increased competition or more stable pricing. Prohibition of advisory trend
analysis could serve to exacerbate the underpricing and loss forecast errors that contribute to the cycle and price/availability crises but there is no certainty about this. If the present exemption for joint trend analysis was continued, regulatory scrutiny of advisory trend factors and/or monitoring of competition could alleviate concerns about any potential negative impact on competition. Alternatively, trend analysis might be delegated to private consulting firms who would be given access to data collected by advisory organizations. This would preserve some of the efficiencies achieved with advisory/rating organizations but address antitrust concerns by severing the ownership link to the industry.

Solvency Regulation and Guaranty Funds

Solvency regulation also plays a critical role in insurance markets. Solvency regulation covers a number of areas including licensing, minimum capital requirements, financial reporting and surveillance, examinations, control of financial transactions and involvements, and actions with respect to troubled companies. The objective of financial regulation is to ensure that insurers maintain sufficient resources to pay the claims of their policyholders. The interest in solvency regulation as it relates to the underwriting cycle is two-fold: 1) the effect of solvency regulation on insurers' pricing and underwriting behavior, and 2) the prevention of insolvencies due to naive or risky behavior on the part of insurers during soft markets.

Theoretically, in the long run, sufficiently strict financial standards would restrict an insurer's ability to engage in below-cost pricing. An insurer that charged inadequate rates over a period of time would eventually reduce its surplus to a level considered unacceptable by regulators and would be subject to regulatory action. Thus, insurers would be forced by financial regulation to maintain rates no lower than their average cost. However, traditional solvency measures are subject to certain practical limitations in terms of inducing insurers to price sensibly. Solvency regulation is inherently hampered in its ability to affect short-term pricing decisions because of the inevitable lag between when rates are set and claims are paid. There also is the possibility that regulation of insurers' leverage ratios could lead to sharper cutbacks in output resulting in reduced availability and higher rates during hard markets (Winter, 1988b), although this has yet to be tested empirically.
Still, more stringent and pro-active solvency regulation could make it more difficult for insurers to undervalue their product and engage in risky behavior. Through the NAIC’s Solvency Policing Agenda and Financial Standards and Accreditation Program, states are significantly strengthening their solvency-related statutes and regulatory activities. While the primary benefit of these efforts should be more financially sound insurers, they also might have some positive effect on pricing stability.

At the same time, it must be pointed out that tighter solvency regulation may well increase insurers’ costs and restrict entry as well as possibly hasten exits or force mergers and consolidations. Stricter rules on investments and reinsurance arrangements also will tend to increase insurers’ relative costs of doing business. The tradeoff for decreased risk of insolvency will be higher insurance prices. Ultimately, regulators have to balance these considerations in determining optimal solvency measures.

The Harrington-Danzon study does have implications for improving solvency surveillance. Their research suggests that greater surveillance resources might be targeted toward: 1) inadequate pricing, 2) excessive premium growth in long-tail lines, and 3) less experienced insurers. They also suggest that regulators should monitor more closely insurers whose shareholders, managers, and agents have weak incentives for safe operation. This could be reflected in underpricing, excessive investment risk, and high premium-to-surplus ratios. This becomes even more critical if an insurer’s policyholders have little concern if it becomes insolvent due to guaranty fund protections. Incentives for prudent operation could be enhanced by forcing policyholders (or their brokers) to bear a greater portion of the cost of an insolvency. This could be accomplished by increasing deductibles and co-payment provisions and providing lower limits of protection (Stewart, 1990; Jackson, 1990).

**Alternative Insurance Mechanisms**

In the face of price/availability crises, a number of states developed or considered alternative mechanisms for providing insurance to consumers or businesses. Among the devices created have been mar-

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ket assistance plans, assigned risk plans, joint underwriting associations, state reinsurance programs, state-sponsored insurance plans, and self-insurance pools. At the federal level, Congress extended the Risk Retention Act to facilitate the formation of risk retention and purchasing groups for commercial liability coverage. Conceptually, alternative insurance mechanisms, when properly structured and operated, may offer some solution to the problems caused by a tight insurance market. To the extent that certain mechanisms are not affected by profit considerations and interstate and inter-industry movements in capital, they might offer a more stable source of coverage through cycles in commercial markets. However, if not properly structured and regulated, certain mechanisms could worsen the cycle and some could leave their participants unprotected if they fail. The Risk Retention Act, for example, has been subject to considerable abuse as severa risk retention groups and purchasing group insurers have failed.

On the whole, the use of alternative insurance mechanisms such as market assistance plans and self-insured pools may hold some advantages for certain kinds of risks. Market assistance plans can help to ease buyers’ difficulties in finding coverage in hard markets. Pooling arrangements may be advantageous for similar types of businesses which are able to pool their own capital to spread risk. However, market assistance plans and self-insured pools will not offer a solution for all risks. Moreover, to the extent that alternative mechanisms simply shift costs without bringing in new capital or defer payment of soaring claim costs, they may mislead policyholders and the public into thinking that the underlying problems have been resolved. Self-insured pools also will be subject to some of the same financial market and reinsurance market developments that affect primary insurers.

Legal System

Tort reform has proved to be one of the most contentious areas of policy discussion but the research on price/availability crises suggests that it is critical. From the standpoint of price/availability crises, the frequency or size of damage awards per se is not the problem but, rather, the uncertainty about them. Shifting legal doctrine on what claims are compensable, apportionment of fault, and determination of damages has made it much more difficult to accurately
price long-tail liability lines. Insurers’ underestimation of their ultimate losses in the early 1980s contributed significantly to the severity of the underpricing that occurred during that soft market and the resulting correction when the market tightened. More importantly, the continuing uncertainty about future loss costs will continue to contribute to pricing instability and to higher rates and restricted availability during the next hard market.

The NAIC studies imply that tort reform measures that reduce uncertainty about legal liability and future damage awards will have the most benefits in terms of mitigating price/availability crises. Measures that limit the frequency and size of damage awards also should tend to limit price increases during hard markets. First, more clearly defining the rules which determine what claims are compensable would reduce a major source of uncertainty. Second, limits on damages, particularly noneconomic damages, would make it easier for insurers to estimate the severity of future claims and total claim costs, although the fairness of such caps may be questioned. Third, eliminating or modifying the doctrine of joint and several liability also could reduce uncertainty about the potential liability of a policyholder who might otherwise be held fully responsible for all damages even if other parties were primarily at fault.

There are, of course, other considerations which must be weighed against the benefits that might be obtained from reducing uncertainty about the outcomes of the legal system. Efforts to constrain those outcomes to make them more predictable will adversely affect some parties whose circumstances do not fall within the established norms. There are those who argue that the rights of individuals to seek compensation should not be compromised regardless of how benefits and costs might be weighed for society as a whole. In addition, tort reform measures could reduce incentives for safe behavior on the part of businesses and professionals. Yet, maintainance of what some characterize as a “legal lottery system” not only results in widely varying compensation for injured parties, but imposes significant costs on the economy and strains the insurance mechanism.

Data Reporting

A number of states responded to the liability insurance crisis by enacting extensive data reporting requirements. The expressed objec-
tive of such requirements is to document the frequency and severity of claims and factors underlying changes in claim costs. The research on cycles and crises in property/casualty insurance suggests that certain enhancements to data reporting might have some benefit if it could help insurers and regulators better forecast changes in the frequency and severity of claims or identify forces affecting those trends. Better and more accessible information on premiums and exposures also would assist tracking of insurer pricing activity and facilitate further research on the causes of the underwriting cycle and the effect of different regulatory programs. Enhancements in these areas could help improve pricing accuracy and identify where legal reforms might be particularly helpful.

To that end, the NAIC is conducting a review and revision of statistical reporting requirements for property/casualty insurance lines. Minimum uniform statistical reporting requirements for all insurers and statistical agents have been developed for general liability, private passenger automobile, homeowners, dwelling fire, and mobile home lines. Minimum requirements will be developed for other lines over the next two years. Special quarterly fast track monitoring reports and semiannual accelerated reports provide loss ratio information on key property/casualty lines and sensitive liability classes and alert regulators to developing problems in those markets. The NAIC also is overseeing a biennial closed claim study which will provide detailed information on the cost and characteristics of general liability claims.

These kinds of efforts to improve information can be useful and cost-effective. However, some of the state data reporting requirements are confusing and burdensome for regulators and insurers and their utility is questionable. To the extent possible, states might wish to utilize the NAIC systems as the basis of their own statistical reporting requirements, supplementing where necessary with additional reporting requirements to respond to their particular needs or concerns.

Regulation of Policy Forms and Underwriting

Within the context of a changing legal system, insurers have sought to limit the scope of their potential liabilities by revising policy provisions. Policy forms and tort law are closely intertwined as the courts ultimately interpret what policy provisions mean. Policy
forms evolve in response to a changing environment as well as developments in case law. As the courts expand tort law, insurers respond by attempting to more clearly define their exposures as outlined in the policy contract and illustrated by the development of the claims-made commercial general liability policy forms and pollution exclusion.

Regulators, however, are concerned that these policy changes expose some insureds to significant liabilities. This is a policy dilemma without an ideal solution, unfortunately. Insurers, understandably, are reacting to changing legal doctrines and expansion of their exposure by the courts. However, this may entail shifting increased risk back to insureds. The removal of insurers' "deep pockets" may ultimately retard damage awards but this is far from a perfect solution if businesses face a greater risk of bankruptcy and injured plaintiffs fail to obtain adequate compensation. Regulators are faced with the "Hobson's Choice" of maintaining viable markets on the one hand and the insurance mechanism on the other. As difficult as that choice is, it may be preferable to preserve at least some portion of the market rather than have none at all. The Berger-Cummins and Cummins-McDonald studies indicate that lower policy limits and coverage exclusions are natural competitive responses by insurers to combat adverse selection and make coverage more available and less expensive for low-risk insureds. Many buyers may not need coverage for certain events included in the standard form. Reasonable policy innovations should be considered but they also should be adequately disclosed and offer a fair exchange of premium adjustments for coverage adjustments.

Similarly, tighter underwriting standards during hard markets stem from diminished capacity and large losses for certain high-risk classes. Understandably, regulators and legislators become concerned when individuals and businesses cannot obtain coverage, particularly if the underwriting criteria used do not appear to be reasonable. Most distressing can be wide swings in the underwriting stringency of a given insurer depending upon market conditions. However, the forces driving underwriting decisions cannot be ignored. Policies which promote adequate rates and less risky behavior during soft markets, as well as sensible tort reform are the best way.

26.Prior (1999) notes a similar argument with respect to the development of the new CGL policy.
to promote greater stability in underwriting standards. At the same time, it is appropriate for regulators to demand rational underwriting policies which respond to legitimate differences in risk and are based on a sound, long-term plan.

In sum, underwriting cycles and price/availability crises in property/casualty insurance appear to be caused primarily by changes in interest rates and loss shocks. In addition, underpricing attributable to naive pricing or excessive risk taking during soft markets could contribute to the severity of hard markets. These findings suggest that policy measures which reduce uncertainty about legal liability and future damage awards will be beneficial in terms of mitigating price/availability crises. Stronger solvency measures could help to discourage underpricing in soft markets. Rate regulation, appropriately administered, might also be utilized to limit underpricing due to excessive risk taking or naive behaviors of insurers but it should be approached carefully due to the potential for adverse effects on the marketplace.

References

Introduction


The failure of reinsurers was once unlikely enough that regulators concentrated their energy regulating the solvency of primary writers. Now, reinsurers are in the cross hairs of regulators. Uncollectible reinsurance recoveries have been the undoing of many primary writers, large and small. As a sign of this concern, the NAIC is about to adapt major modifications in its Credit for Reinsurance Model Act.

Robert Bailey—speaking from the vantage point of an actuary with a successful career as a professional reinsurance broker, a senior staffer at A.M. Best, and regulator—offers practical indicators of financial weakness in a reinsurer. First he details ten risk areas and associated scores for reinsurers’ characteristics. Next he combines scores for risk areas in formulae evaluating reinsurers. Unlike some advanced statistical techniques in vogue among the research community, Bailey offers a system based on judgement. Its strength is the ability to focus on key “clues” to financial weakness and to organize the evaluation in a systematic and objective way.

Clearly there is a need for leading edge modeling and testing of new theories about solvency monitoring. Just as certain, there is a need for advice to the day-to-day practitioner pressured to place the end of year contracts with suitable markets. In both areas, careful analysis, clear explanations, and ongoing critiques based on results are the keys to success.
Analyzing and Ranking Reinsurers

Robert A. Bailey, FCAS

Abstract

Drawing upon his years of experience in evaluating and rating re-

insurers, the author suggests a method of ranking these specialized insurers. The system emphasizes the weaknesses and risks of in-
dividual reinsurers, in assigning an overall rating that may alert regulators, purchasers of reinsurance, or investors to possible areas of concern and the relative degree of risk.

Introduction

In the last 10 years, analyzing reinsurance security has taken on in-
creased importance because of the increase in the number of re-
insurers during that time plus the substantial uncollectible reinsurance problem for certain ceding companies who were not discriminate enough in selecting reinsurers.

Security is a much greater concern for buyers of reinsurance than for buyers of insurance because state guaranty funds protect most insurance contracts but none of them covers reinsurance. In addi-
tion, the amounts for which recovery is sought is generally much greater for most buyers of reinsurance than for most buyers of in-

* Senior vice president for E.W. Blanch Co., Minneapolis, MN, where he is responsible for developing information on reinsurance security. Previously he had been vice president of A.M. Best Co. with responsibility for rating property-casualty insurers and Director of the NAIC Data Base with responsibility for producing and evaluating the effectiveness of ISRS reports.
As an aid to the reinsurance buyer who needs to develop security procedures for analyzing and selecting reinsurers, this review sets forth approaches and techniques that are being used by some reinsurance buyers. A similar approach could be used to analyze and rank insurers.

A Formula for Measuring and Scoring Areas of Risk

Some sort of a scoring system is needed to rank insurers according to their relative risk and strength, especially when analyzing a large number of insurers. A scoring system helps to organize the vast array of information that is available, and helps to systemize the analysis of that data. The scoring system here is one that evaluates each of the various risk factors and assigns a score to each factor, ranging from zero for a perfect or adequate position as respects that factor up to higher scores reflecting the degree of risk, weakness or deficiency in that area. The scores for each factor are summed to obtain the total score for the company. The score reflects risks that exceed the norms for each area. Since the norms are set at a conservative level, being better than the norm in one area is generally not a reason to ignore a weakness in another area. A chain is only as strong as its weakest link. Accordingly, the scoring system emphasizes weaknesses and risks because they are the most important concerns in evaluating security.

The IRIS tests use a similar scoring system. Eleven tests are evaluated for "unusual" results. The number of unusual results is the score for the company. The best score is zero, indicating the absence of anything unusual. But the scoring system does not give added weight for greater degrees of the "unusual." For example, once the ratio of premiums to surplus exceeds 3 to 1, the score is 1 for that test, regardless of how high the ratio may be. Obviously, a ratio of 6 to 1 is more hazardous than 3 to 1, but no further recognition is given under the existing scoring system. In addition, the system omits a number of important areas of risk, such as management, size, age, gross leverage, quantity and quality of reinsurance, and investment risk, even though the rate of insolvency has been strongly correlated with such factors.
It is impossible to devise a precise formula for predicting insolvencies because of the many unknowns, complexities and uncertainties involved. It is important to avoid the temptation to devise an ever-increasingly complex formula in a never-ending search for the perfect formula. A complex formula is harder to understand and use. Simplicity has a value in providing a practical starting point for the use of judgment. If the formula is too complex to understand, the user is at a loss to know how to modify it to reflect unusual and unique circumstances. Accordingly, the formula here suggested is relatively simple, and it is designed to facilitate the use of judgment.

Ten major areas of risk are suggested for evaluation. There are many other possible areas that could be added, but generally they would overlap with one or more of the 10 selected areas. The 10 areas selected are diverse and generally cover the major areas of risk. Which ones are the best indicators is something that varies with each cycle. For example, in the early 1980s when many insolvencies resulted from severe underpricing of commercial coverages and excessive use of underpriced reinsurance, the factors involving reinsurance and gross leverage were the best indicators. Investment risk was not a good indicator because the stock and bond markets were both rising as the underwriting cycle deteriorated. But in the insurorce solvency crisis of the early 1990s, the leading cause of adversity was the decline in the stock and bond markets. At that time, the Investment Risk Factor would have been one of the best indicators. No attempt to base a rating system entirely on a small sample of recent insolvencies has been adequately successful in subsequent time periods. Which factors will be the best indicators for the next insurance crisis will depend on the causes of that crisis. Not knowing, in advance, what those causes will be, we have tried to cover the major potential sources of risk.

For each of the 10 areas of risk, various adjustments are suggested which may be made on a judgment or optional basis. Included in these adjustments are several designed to reduce some of the distortions that are caused or permitted by statutory accounting. By reducing such distortions, insurers can be evaluated on a more comparable basis. For example, statutory accounting permits most bonds to be carried at amortized cost, which means that it is unlikely that any two insurers will carry the same bond at the same value. Adjusting bond values to market value places all insurers on the same basis.
The principal distortions introduced by statutory accounting are:

1. Amortized vs. market values of bonds, preferred stock and mortgage loans,

2. Partial non-recognition of prepaid expenses, and

3. Differences between statutory loss reserves and a fully adequate reserve discounted to present economic value.

We refer to these three adjustments as the equities in the asset values, unearned premiums, and unpaid losses. These equities can be negative as well as positive. All three of these equities are largely controllable by the insurer. Consequently, their size and whether they are positive or negative are strongly correlated with the insurer's financial strength. These adjustments tend to be most significant for the large, old, commercial lines and reinsurance carriers where statutory data can mask substantial strengths and weaknesses. Although the adjustments are difficult because they are estimates and judgmental, nevertheless they permit a more valid and useful analysis.

Each of the risk factors may be scored mechanically, or varying degrees of judgment may be introduced to modify the mechanical score to reflect the characteristics peculiar to each company. In either case, there will still be some uncertainty. But the resulting scores will be a useful tool to rank the available insurance markets, and the exercise of scoring each of the 20 risk factors will help to focus attention on potential problems. The scoring system suggested (see Table 1) is not immutable and may be modified as the user may deem appropriate.

Shown below are four reinsurance carriers that became insolvent shortly after receiving passing scores under the IRIS test and Best's rating system, they are an illustration of leading indicators that were present but were overlooked or not adequately recognized by the rating systems used at the time. [Under the IRIS ranking a passing score would be 5 or less. Under the Best's system a passing score would be B- or better.] Ratings under the Suggested System are provided for comparison (Table 2).

The considerations that the Suggested System considers are explained below:
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<th>Risk Factors</th>
<th>Best Score</th>
<th>at</th>
<th>Worst Score</th>
<th>at</th>
<th>Factor</th>
<th>Average Score Preferred Reinsurers</th>
<th>Average Score Reinsurers</th>
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<td></td>
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<td>23</td>
<td></td>
<td>2</td>
<td>0</td>
<td>3</td>
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<td>10</td>
<td></td>
<td>1</td>
<td>0</td>
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<td>7. Ceded Reinsurance</td>
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<td>8. Liabilities to Liquid</td>
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### TABLE 2
Suggested Scoring System, IRIS tests, and Best’s Rating System
(Based on 1983 Data)

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<td>4. Operating Profit</td>
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<td>8. Liabilities to Liquid Assets</td>
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<td></td>
<td></td>
<td>.34</td>
<td>.385</td>
<td>B+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>B+</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>A</td>
</tr>
</tbody>
</table>

### 1. Management

If management has been steadily engaged for a long time in areas where it is recognized as having better than average expertise, and its skills, integrity and performance are recognized as better than average—assign zero points. To the extent that any of these areas are lacking, assign up to 10 points, especially if management is operating in new areas after troubles in former areas, or is overly aggressive and underpriced in volatile, exotic and hazardous lines.

If owners, management or underwriting agents have been closely associated with other insurers that became insolvent or that had to be rescued by another party, assign up to 10 points.

If management controls are lacking or there is inadequate depth of management, or if incentives are aimed more at volume than profit, assign up to 10 points.
If it is likely that the company is being "dressed up" for sale or transfer to new owners or managers in the next year or two, assign up to 5 points.

Review the Best's, Insurance: Solvency International, Standard & Poor's, and Moody's ratings and stock market evaluation of the company and its parent. If any of the ratings are low or if the stock market evaluation (number of shares times the price per share) is low in relation to book value or is declining significantly, assign up to 5 points if the causes of the low rating are not known or not fully reflected in the other risk factors. Maximum score is 10.

2. Size
Assign a score depending on size of capital and surplus:

<table>
<thead>
<tr>
<th>Size</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1 Billion and Up</td>
<td>0</td>
</tr>
<tr>
<td>$500 Million to $1 Billion</td>
<td>1</td>
</tr>
<tr>
<td>$200 Million to $500 Million</td>
<td>2</td>
</tr>
<tr>
<td>$100 Million to $200 Million</td>
<td>3</td>
</tr>
<tr>
<td>$50 Million to $100 Million</td>
<td>4</td>
</tr>
<tr>
<td>$30 Million to $50 Million</td>
<td>5</td>
</tr>
<tr>
<td>$10 Million to $20 Million</td>
<td>6</td>
</tr>
<tr>
<td>Under $10 Million</td>
<td>7</td>
</tr>
</tbody>
</table>

If the company is pooled or 100 per cent reinsured with another company, use the consolidated surplus. Surplus may be adjusted by the estimated equities in unearned premiums, unpaid losses, and statement value of assets. (See description of these estimated equities after the tenth risk factor.)

If a parental guarantee or cut-through is available, use the size of the parent.

If the company is wholly owned by an insurer with a similar name, use half the score for the company plus half the score for the parent.

The correlation of size with durability is illustrated by the recent experience of the 103 largest reinsurers in 1981. (A list of the largest reinsurers based on 1981 reinsurance premiums assumed less
ceded was published Dec. 6, 1982, in Best’s Insurance Management Reports. This list plus the New York Insurance Exchange is the basis of this illustration. During the five years from 1982 to 1987, all of the top 15 reinsurers, who had two-thirds of the market share in 1981, remained active in reinsurance; 8 of the next 15, or 25 per cent, became insolvent or ceased to be active in reinsurance, and 20 of the next 50, or 40 per cent, became insolvent or ceased to be active in reinsurance. Some of those who ceased to be active became unofficially insolvent and their creditors accepted commutations at less than full value in preference to being subject to a receivership, and some withdrew or merged or were sold to new interests.

Size of surplus is relevant to capacity, ability to absorb mistakes, commitment by owners, expertise, and quality of business offered to the reinsurer.

3. Age

Assign a score depending on the number of years that the company has been engaged in business without a significant change of direction and with a relevant volume of business in its current lines of business:

<table>
<thead>
<tr>
<th>Years</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 and Up</td>
<td>0</td>
</tr>
<tr>
<td>15 to 19</td>
<td>1</td>
</tr>
<tr>
<td>10 to 14</td>
<td>2</td>
</tr>
<tr>
<td>7 to 9</td>
<td>3</td>
</tr>
<tr>
<td>5 to 6</td>
<td>4</td>
</tr>
<tr>
<td>6 to 4</td>
<td>5</td>
</tr>
</tbody>
</table>

If the net premium written in any of the five most recent years is less than one-fifth that of the latest year, or if in any of the 10 most recent years it is less than one-tenth that of the latest year, or if in any year it is less than one-tenth that of the year 10 years later, exclude that year and all prior years when computing the number of years with a relevant volume of business.
If the company has the same ownership and similar management as an older property-casualty insurer, use the age of the older company.

Of the 100 largest reinsurers in 1981, described in the previous section, only 37 had been in business 20 years earlier. The dropout rate is, the next 5 years was 19 per cent for those 37, and 33 per cent for the remaining reinsurers. Age is relevant to expertise, quality of the business offered to the reinsurer, and to conservative characteristics of management. Age is also related to size, as older companies tend also to be larger. Best's, Standard & Poor's and Moody's do not rate entities that are less than 5 years old.

4. Operating Profit

\[
\text{Score} = \frac{1}{2} \times [10 - \text{Operating Profit}] \\
\text{Operating Profit} = \frac{\text{Net income} - \text{realized capital gains} + \text{miscellaneous operating charges to surplus}}{\text{the larger of net earned premium or capital and surplus at end of year}}
\]

The one-year reported operating profit may be modified if it has been distorted by a significant change in the equities in unearned premiums and unpaid losses, or by non-recurring reinsurance transactions or other events. If nothing has changed but growth has occurred, the reported operating profit may be understated by the amount of increases in the equities in the unearned premiums and unpaid losses.

If gross premiums are more than twice net premiums, reported operating profit may be less reliable and, if large, may be divided by gross premiums instead of net premiums if that would give a better estimate of the true margin in the business.

A profit ratio based on the latest three or five years may be used instead, if it would give a better estimate of expected results for the next year. The latest year is a better leading indicator than a three or five year average, but the latest year may be distorted by non-recurring transactions.

In various studies over the years, profit has always been a good indicator. Generally, measures that exclude capital gains have been better, as have measures that include investment income. Capital
gains are too volatile and too controllable to be a reliable predictor of financial condition. We have opted for the most complete measure that excludes capital gains. For the most recent such evaluation of effectiveness of different profit measures, see A Non-Parametric Approach to Evaluating Reinsurers' Relative Financial Strength by Ludwig & McAuley (Casualty Actuarial Society, 1987 Discussion Paper Program).

5. Gross Leverage

Score = Gross Leverage - 3, minimum of 0, maximum of 20

Gross leverage can be measured simply as the ratio of gross premiums plus gross liabilities to surplus, but various adjustments are recommended to give more comparable results. A detailed formula follows:

Gross Leverage = \[ \text{Direct premium written} + \text{reinsurance assumed} - \text{reinsurance ceded to U.S. affiliates} + \text{net liabilities} + \text{encumbrance on real estate} + \text{reinsurance recoverable on unpaid losses and unearned premium from non-affiliates and foreign affiliates} + \text{unNR ceded reinsurance recoverable from non-affiliates and foreign affiliates} - \text{funds withheld by company under reinsurance treaties} \] (but not more than the previous two items of reinsurance recoverable) - \text{estimated equities in unearned premiums and unpaid losses} + \text{capital and surplus} - \text{investments in affiliates} + \text{estimated equities in statement values, unearned premiums and unpaid losses}.

If the company owns subsidiary property-casualty insurers or pools 100 per cent with affiliated insurers, gross leverage may be calculated on a consolidated basis if data is available.

Gross leverage reflects the pricing risk (measured by the premiums), the reserving risk (measured by the liabilities), and the reinsurance risk (measured by ceded premiums and ceded liabilities), all related simultaneously to the surplus of the company.

6. Increase in Gross Leverage

Score = increase in Gross Leverage, minimum of 0, maximum of 10
If the Gross Leverage has increased substantially for more than one year and is expected to continue its increase, the score may be increased accordingly. Rapid growth often leads to surprises and unexpected problems, but growth in premium is more meaningfully measured against the size of surplus than against the size of last year's premium. A large percentage increase in premium is of less significance if leverage to surplus is low. A smaller percentage increase in premium may be more significant if leverage is already high and especially significant if surplus is declining. Similarly, a decline in surplus is more significant when leverage is high than when leverage is low. Hence, a decline in surplus is more meaningfully measured by its effect on leverage than by the simple percentage change in surplus.

7. Ceded Reinsurance

Score = 1/10 [Ceded to Gross Percent][1 + [unrated recoverables + total recoverables]], minimum of 0, maximum of 10

Ceded to Gross Percent = 100 [Ceded Reinsurance premium - premium ceded to United States affiliates] / [Direct premium written + reinsurance assumed premium - premium ceded to United States affiliates].

Unrated recoverables = ceded reinsurance recoverable on unpaid losses and unpaid premiums for reinsurers not rated "A" or better by A.M. Best for United States reinsurers and by Insurance Selvency International for United States and non-United States reinsurers. Exclude from both unrated and total recoverables any amounts recoverable from United States affiliates that are rated the same or better than the company.

If any of the reinsurance recoverables are due from reinsurers who are no longer active and are not adequately secured, double such amounts when computing unrated recoverables.

The Ludwig & McAsley study previously cited found that several measures of ceded reinsurance were the most effective solvency
Investment Risk = 100[(20% of common stocks + 15% of preferred stock + 12% of mortgage loans + 5% of bonds with maturity over five years + 10% of bonds with maturity over five years through 10 years + 15% of bonds with maturity over 10 years through 20 years + 17% of bonds with maturity over 20 years) + additional 20% of all bonds below investment grade] / (capital and surplus + estimated equities in asset values, unearned premiums and unpaid losses).

If the cash yield on bonds is less than 4%, use 12% of bonds with maturity over five years through 10 years, 20% of bonds with maturity over 10 years through 20 years, and 30% of bonds with maturity over 20 years. The cash yield on bonds is the interest earned on bonds during the year less the accrued discount plus amortization of premium, all divided by the average amount of par value of bonds held at the beginning and the end of the current year.

This risk factor measures the exposure to fluctuations in the market values of stocks and bonds. The record of the stock and bond markets for the past ten years has shown that substantial risks exist and cannot be ignored.

10. Loss Reserve Development

Score = 1/10 (Loss Reserve Development per cent of Capital and Surplus, minimum of 0, maximum of 10).

Loss Reserve Development per cent of capital and surplus = page 21, line 64 column (I) of Annual Statement, plus 100 X loss reserve discount for prior year / capital and surplus for prior year. This is the one-year development for the latest year.

If there is reason to believe that the one-year development on the prior year reserves is not representative of the adequacy of the current reserves on an undiscounted basis, appropriate adjustments should be made.

The loss reserve discount can be either a reduction in the liability for loss reserves shown on the liability page (as compared to the loss reserves in schedules O and P) or as a write-in asset or negative liability on the balance sheet pertaining to future investment income or discount on the loss reserves.
Estimated Equities

The formulas for several of the risk factors provide for an adjustment for estimated equities in statement value of assets, unearned premiums, and unpaid losses. These are described below.

Market Value Less Statement Value of Bonds, Preferred Stock and Mortgage Loans. This is the equity in statement values. In some instances the company discloses the market value of such assets, but more commonly the market value is not disclosed for substantial portions of the bond portfolio, preferred stocks and mortgage loans, which are carried at amortized cost. When market values are not disclosed, they may be estimated from the information provided on yield, maturity, par value, quality and type of security, plus current market yields. A suggested formula for estimating market value is as follows:

\[
\text{Market Value} = \frac{\text{Par Value}}{[1 + Y]^n} + \text{Interest} \times \frac{\text{Statement Value}}{\text{Mean Statement Value}} \times \frac{1 - [1 + Y]^{-n}}{Y}
\]

Par Value is shown on Schedule D-Summary, Column 5, Line 30 for bonds, Page 2, Line 2.1 for preferred stock, and Page 2, Line 3 for mortgages.

Interest is shown in Page 6, Part 1, Columns 8, Lines 1 through 1.3 (reduced by the pro rata share of the net accruals in *footnote* for bonds, Lines 2.1 and 2.11 for preferred stock, and Line 3 for mortgages.

Statement values are shown on Page 2.

Mean statement values are average for the current year and prior year.

N is 7 for mortgages, 10 for preferred stock, and for bonds is the average maturity in years as computed from Schedule D-Part 1A.

Y is the yield at market values. For bonds the market yields for U.S. government, tax exempt and other bonds can be weighted by the amounts of interest reported for those categories on Page 6, Part 1, Column 8.
Estimated Equity in Unearned Premiums = [Unearned Premiums - Reserve for Rate Credits and Retrospective Returns] \times [Adjusted Expense Ratio], minimum of 0.

Adjusted Expense Ratio = Expense Ratio + 1/100 Operating Profit [Risk factor 4] = 0.04 [Capital and surplus at end of prior year + capital and surplus at end of latest year - [earned premium during latest year or capital and surplus at end of year, whichever is larger], minimum of 0, maximum of the Expense Ratio. The multiplier of 0.04 is approximately half of the average yield on long term tax exempt bonds.]

Expense Ratio = Other Underwriting Expenses Incurred + Net premiums written, minimum of 0, maximum of 0.5.

Estimated Equity in Unpaid Losses = [Unpaid losses + unpaid loss adjustment expenses] \times [1 - (adequacy factor)\times\text{discount factor}].

Discount factor = the present value of the proportions of the initial loss reserve estimated to be paid in each subsequent year, assuming all payments are made in the middle of the year, using an interest rate approximately equal to the average yield on long term tax exempt bonds. For example, if it is estimated that half of the initial reserve is paid in the first year, one-fourth in the second year, one-eighth in the third, one-sixteenth in the fourth, etc., and if an interest rate of 8 percent is used, and payments are assumed to be at the middle of each year, a discount factor of 0.6896 would be obtained.

Adequacy factor = [Estimated adequate loss and loss expense reserves on an undiscounted basis] \div [Balance sheet liabilities for unpaid losses and unpaid loss adjustment expenses - any write-in asset for future investment income on loss reserves + any write-in negative liability for discount on loss reserves]. If the reposed loss and loss expense reserves are expected to be accurate on an undiscounted basis, an adequacy factor of 1.00 would be used. If adequate reserves are estimated to be 10 per cent more than reported reserves, an adequacy factor of 1.10 would be used.

There are many indicators of reserve adequacy, none of them completely reliable. Commonly used indicators are 1) developments on prior reserves, 2) ratio of the company's reserves to the industry average level for the same book of business by line and by year (cal-
culated by applying the in-dustry ratios of reserves to earned premi-
uns for each line, each accident year, to the company's earned pre-
miums for the corresponding lines and years), 3) the change in the
company's level of reserves in relation to the industry average re-
serve level, 4) projections of the company's recent rate of payout, 5)
squaring the triangle on Schedule P-Par 3. In general, it is better to
be conservative than to be too optimistic, especially if the book of
business is new, rapidly growing, exotic or heavily reinsured.

Clues to Adequacy

Just as the way a person walks (slow and slouching, or with a swag-
gen, or fast, deliberate and erect), gives clues to that person's work
habits and character, so also the way an insurer walks gives clues to
that insurer's reserve adequacy. If hidden strengths are noticed in
various places, the loss reserves are more likely to be strong. If, on
the other hand, signs of hidden weaknesses are observed, the loss
reserves are more likely to be weak.

One such clue is whether the company makes a practice of re-
alizing gains or losses on bonds and real estate. Realizing gains is
often a sign of weakness if it is done for the purpose of window-
dressing. Realizing losses is often a sign of strength. Similarly, if the
market value of assets is significantly greater than statement value,
that is usually a sign of strength. The converse is usually a weakness.

Another clue to potential weakness is the excessive use of ceded
reinsurance, especially if substantial statutory gains are realized on
ceded reinsurance. Loss reserve adequacy, itself, is a clue to other
potential strengths and weakness.

Conclusion

The scoring system suggested here should be a helpful supplemen-
to both the IRIS and Best's systems, by focusing attention on indi-
vidual areas of weakness, and by subsuming those areas into a nu-
meric over-all ranking of the company. But this system, like all such
systems, is only a tool that must be used in connection with other
factors available to the prudent regulator, buyer, or investor.