CIPR Summit:
Exploring Insurers’ Liabilities

August 27, 2013
Indianapolis, Indiana
Material Packet

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Agenda

Day 1: August 27, 2013

(White River Ballroom F)

Attendee Sign-In and Material Pick-Up: 9:30 – 10:00 (Registration Area)

Welcome Address
10:00 – 10:10  Senator Ben Nelson, CEO, NAIC

Overview and Introduction
10:10 – 10:30  Moderator: Ed Toy, NAIC
Introduction: Goals and Overview

Session 1: Impacts of Current Liability Reporting
10:30 – 11:00  Speakers: Mike Angelina, American Academy of Actuaries (AAA)
Steven Weisbart, Insurance Information Institute (III)
Jessica Leong, Guy Carpenter & Co, LLC
Areas to be Covered:
1. Underwriting Cycles
2. Ups and Downs of Reserving
3. Evaluating Insurer Stock Prices
4. Systemic Impacts

Session 2: Property/Casualty Panel
11:00 – 11:30  Speakers: Kris DeFrain, NAIC
Mike Angelina, AAA
Areas to be Covered:
1. Evaluating Current Reserving Methods
2. Reserve Redundancy/Inadequacy
3. Impact on Pricing

Lunch: 11:30 – 12:00 (White River Ballroom F)

Continued on Page 2
Day 1: Continued

| Session 3: Life Panel | 12:00 – 1:30 | Speakers: Larry Bruning, NAIC  David Neve, Aviva  Mike Boerner, Texas Department of Insurance |

Areas to be Covered:
1. Evolution Toward Principles-Based Reserving (PBR)
2. Issues with Internal Modeling
3. Implementation Issues

| Session 4: Going Forward | 1:30 – 2:20 | Speakers: Mike Angelina, AAA  Jessica Leong, Guy Carpenter & Co, LLC  Larry Bruning, NAIC |

Areas to be Covered:
1. Managing Underwriting Cycles
2. Redundant and Inadequate Reserving
3. Next Steps

| Closing Remarks | 2:20 – 2:30 | Host Review |
Biography Information

Michael E. Angelina, ACAS, MAAA, CERA
Executive Director, Academy of Risk Management & Insurance
Erivan K. Haub School of Business, Saint Joseph’s University

Mike Angelina joined Saint Joseph’s University in April 2012 to lead the Risk Management and Insurance program within the Haub School of Business. Prior to joining Saint Joseph’s, he was an executive officer with Bermuda based insurer and reinsurer, Endurance Specialty Holdings, Ltd. as its Chief Risk Officer & Chief Actuary. In this capacity he led the global pricing, reserving, and risk management functions with a particular emphasis on Enterprise Risk Management.

Mr. Angelina is an Associate of the Casualty Actuarial Society, a Chartered Enterprise Risk Analyst, and a Member of the American Academy of Actuaries, currently serving on the Academy Board of Directors as Vice President - Casualty. Mr. Angelina began his actuarial career with CIGNA and then joined Tillinghast (now Towers Watson) in 1988 where he participated in the development of Tillinghast's excess of loss pricing system and its Global Loss Distributions initiative, as well as numerous client assignments, with a focus on mergers & acquisitions, pricing and reserving for reinsurance companies and multi-line insurers. Mr. Angelina worked for one year for Reliance Reinsurance Corp. as a Vice President and Actuary prior to returning to Tillinghast in 2000 leading the Philadelphia office.

Mr. Angelina is the co-author of Tillinghast's industry-wide asbestos actuarial study and participated in the development of the 2003 FAIR Act (proposed Federal asbestos legislation). Mr. Angelina is a member of the American Academy of Actuaries’ Committee on Property Liability Financial Reporting, and Chairperson of its Casualty Practice Council. He has also served as Chairperson of the Casualty Practice Council’s Emerging Issues Task Force. He is a frequent speaker at industry conferences covering topics such as Enterprise Risk Management, Risk Governance, Loss Reserving, International Issues, Capital Allocation, Regulation, Market Conditions, and Pricing Trends.
Mike Boerner  
Director Actuarial Office, Financial Regulation Division  
Texas Department of Insurance

Mike is the Actuarial Director of the Actuarial Office within the Financial Regulation Division at the Texas Department of Insurance. Regulatory responsibilities include oversight of annual actuarial reviews and the actuarial portion of insurance company examinations in Texas.

NAIC involvement includes chairing the NAIC Life Actuarial (A) Task Force (LATF), chairing the Emerging Actuarial Issues (E) Working Group, and member participation in the PBR Implementation (EX) Task Force. Mike also participates in a number of other NAIC groups. Significant NAIC accomplishments include contributions to the LATF and NAIC adoption of the Valuation Manual and efforts to support the NAIC Joint A&E Working Group and NAIC adoption of changes to Actuarial Guideline 38. Current efforts include contributions to support the implementation of the Valuation Manual and Principle Based Reserves.

Mike is a member of the American Academy of Actuaries and a member of the Life Practice Council of the American Academy of Actuaries.
Larry Bruning
International Life Actuary
National Association of Insurance Commissioners

Bruning currently represents the NAIC and State Insurance Regulators on various subcommittees and working groups of the International Association of Insurance Supervisors (IAIS). Currently he is assisting in drafting revised international Insurance Core Principles (ICP) that will be binding on international insurance regulators. He also represents the NAIC on federal working groups that were formed as a result of the Dodd-Frank Act.

He has participated in SOA meetings as a volunteer speaker for various sessions, served a 3-year term on the Board of directors of the American Academy of Actuaries and has participated as a volunteer speaker for many Academy meetings. Prior to joining the NAIC, he was a regulatory actuary for the state of Kansas. During that time, he was chair of the Life and Health Actuarial Task Force of the NAIC, served on many NAIC committees and working groups, and was the recipient of the NAIC's Dineen Award. He has also taught Theory of Interest and Actuarial Mathematics at the University of Nebraska, Lincoln and Omaha and currently teach those courses at Washburn University in Topeka, Kansas.

Bruning graduated from the University of Nebraska, Omaha with a degree in mathematics. He has 29 years of insurance experience working as an actuary for four life insurance companies. He has experience as both a pricing and valuation actuary in fixed and variable life insurance and annuities as well as long term care insurance.
Kris DeFrain  
**Director, Research and Actuarial Department**  
**National Association of Insurance Commissioners**

Kris DeFrain is the Director of the Research and Actuarial Department for the National Association of Insurance Commissioners (NAIC).

In her position Ms. DeFrain supports NAIC committees, task forces, and working groups on various topics. She is currently charged as primary NAIC staff for the Solvency Modernization Initiative (E) Task Force and the Casualty Actuarial and Statistical (C) Task Force.

She manages a staff of actuaries, statistical analysts, insurance contract experts, economists, and research analysts working on regulatory solvency- and market-related issues, providing regulatory services, and conducting research for the Center for Insurance Policy and Research.

Ms. DeFrain participates in numerous solvency, market, and international projects completed at the NAIC. She provides advice on various actuarial matters and participates in international discussions with counterparts in other jurisdictions. She teaches in NAIC courses and trains on regulatory issues, including topics of P&C actuarial issues and international solvency.

Ms. DeFrain was previously employed at State Farm Mutual Automobile Insurance Company, Universal Underwriters (now part of Zurich North America), and RLI Insurance Company.

She received her bachelor’s degree in finance/actuarial science from the University of Nebraska in 1989. Ms. DeFrain received her FCAS designation from the Casualty Actuarial Society (CAS), where she recently served as Vice President – International and currently serves as a member of the Strategic Planning Committee. She is a member of the American Academy of Actuaries and a Chartered Property & Casualty Underwriter. She is the CAS Delegate to the International Actuarial Association’s (IAA) Insurance Regulation Committee and serves as Co-Vice Chair on the IAA’s Solvency Subcommittee.
Jessica Leong
Senior Vice President and Lead Casualty Specialty Actuary
Guy Carpenter

Jessica Leong is the Lead Casualty Specialty Actuary at Guy Carpenter, leading all their research and advisory on casualty risks. She has written several award winning papers, one of which is on the CAS syllabus and speaks regularly at conferences around the world.
Senator E. Benjamin Nelson
Chief Executive Officer
National Association of Insurance Commissioners

Senator Ben Nelson became Chief Executive Officer of the National Association of Insurance Commissioners (NAIC) on January 18, 2013. He was selected based on his unique combination of executive, legislative and regulatory experience.

Prior to this appointment Senator Nelson served two-terms in the U.S. Senate representing the State of Nebraska from 2001-2013. During his tenure, he earned a reputation as a moderate who was adept at bringing his colleagues on both sides of the aisle together to find compromises on some of the biggest issues facing the country.

Serving on the Senate Agriculture Committee, Senator Nelson's priorities began with safeguarding our nation's food and fuel security. He was also a member of the Senate Armed Services Committee, where he was a tireless champion for our nation's men and women in uniform. In addition, he served on the Senate Appropriations Committee, being a careful steward of taxpayer money to ensure important investments were being made to grow the economy.

Earlier in his career, Senator Nelson was Governor of Nebraska. As governor, he pledged to bridge the gap between rural and urban areas to move forward as "One Nebraska" and to create a "more efficient and effective state government." In 1994, he became the first Nebraska Governor to be elected to a second term in two decades.

Senator Nelson has extensive experience in the insurance sector and started his career in insurance law. He served as CEO of the Central National Insurance Group, as Chief of Staff and Executive Vice President of the NAIC, and as Director of the Nebraska Department of Insurance. Senator Nelson earned a bachelor's degree in 1963, a master's degree in 1965 and a law degree in 1970, all from the University of Nebraska.

Senator Nelson and his wife, former first lady Diane Nelson, have four children and five grandchildren.
David E. Neve  FSA, CERA, MAAA  
Vice President – Capital Management  
Aviva USA  

An actuarial executive with 35 years of experience in capital management, reserve valuation, financial reporting and forecasting, enterprise-wide risk modeling, and corporate finance. Currently serves as Vice-President, Capital Management for Aviva USA in Des Moines, Iowa. His responsibilities include capital planning and forecasting, developing and executing the company’s capital management strategy (including AXXX/XXX reserve financing), managing regulatory and rating agency capital requirements, managing regulatory reserve developments, and corporate risk analysis. Dave has spent most of his career in a variety of corporate roles, including strategic planning, tax planning, capital management, risk management, and financial reporting. Earned the Chartered Enterprise Risk Analyst (CERA) designation in 2008.

Dave is an industry leader in assisting the NAIC and the American Academy of Actuaries in developing a new principle-based valuation framework, and is a frequent speaker at industry and actuarial conferences, seminars and webinars. He currently serves as vice-chair of the Academy’s Life Practice Council, chairman of the Academy’s Life Financial Soundness / Risk Management Committee and chairman of the Life Reserves Work Group. He completed a three year term on the Board of Directors of the Academy in October of 2012.
Edward L. Toy
Director, Capital Markets Bureau
National Association of Insurance Commissioners

Edward L. Toy is Director - Capital Markets Bureau with the National Association of Insurance Commissioners (NAIC). In that capacity, he works with state insurance regulators in the development of tools for oversight of the insurance industry as they relate to investment portfolios. He coordinates with other NAIC staff and state insurance regulators on matters impacting financial/solvency regulation of insurers and capital markets. He also works closely with representatives from the insurance industry and trade associations on matters related to investment practices.

Prior to this he was a portfolio manager and director of trading with Artesian Capital Management, a hedge fund focused on arbitrage opportunities in corporate credit. In particular, the firm focused on basis trading with a short bias in industries and companies that were susceptible to event risk.

Before joining Artesian, he was a Managing Director at Teachers Insurance and Annuity Association (TIAA), which along with its affiliate, the College Retirement Equities Fund (CREF), was one of the largest financial services organizations in the U.S. and the largest retirement system in the world.

His last responsibility at TIAA was as portfolio manager for the convertible securities group. He launched the group in October of 1997 and was successful at building and actively managing a portfolio of publicly registered or 144A convertible securities. Total assets under management grew to approximately $1.5 billion at its peak in 2005.

Immediately prior to those responsibilities, Ed was part of the Structured Finance Group where he was primarily responsible for the group’s non-agency mortgage-backed investments. In addition to his investment responsibilities, Ed also managed the credit risk and prepayment cash flow modeling functions for the mortgage-backed portfolio. From 1983 to 1988, Ed was a generalist in the Private Placement Group. From 1988 to 1990 he managed the division's private placement high yield effort. In 1992, Ed served as Special Assistant to the Chairman of TIAA-CREF.
Dr. Steven N. Weisbart, CLU
Senior Vice President and Chief Economist
Insurance Information Institute

Steven N. Weisbart is senior vice president and chief economist for the Insurance Information Institute. Dr. Weisbart oversees the Institute’s program of economic research and analysis, preparing studies in support of the organization’s communications mission, speaking to media and conducting briefings for member companies, industry organizations and public policymakers. A specialist in annuities, pensions, and life, disability and long-term care insurance, Dr. Weisbart frequently also makes presentations on property/casualty issues to industry audiences as well as legislative forums.

Since joining the I.I.I. in 2005, Dr. Weisbart has authored several significant research papers and articles on a variety of insurance issues, including the threat of an avian flu pandemic and the effect of the aging U.S. population on the property/casualty insurance industry.

Before joining the I.I.I., Dr. Weisbart served as vice president at Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF) in New York, where he was responsible for reports and informational publications for customers and others on insurance, pensions and related financial topics. Prior to joining TIAA-CREF he was associate professor of Insurance in the Department of Risk Management and Insurance in the Robinson College of Business at Georgia State University. Dr. Weisbart is a member of the American Risk and Insurance Association, the American Economic Association, and the Society of Financial Service Professionals.

Dr. Weisbart received his Ph.D. and Master of Arts degrees in economics from the University of Pennsylvania, where he was an S.S. Huebner Foundation Fellow. He received a Bachelor of Arts degree in English from Cornell University. Dr. Weisbart also holds the Chartered Life Underwriter (CLU) credential.

Dr. Weisbart has authored and co-authored four books as well as papers that have appeared in numerous publications, including the Journal of Risk and Insurance, the Journal of Financial Service Professionals (where he was previously an Associate Editor), the CPCU Journal, The Geneva Reports, and Best’s Review. Currently he serves on the editorial board of the Risk Management and Insurance Review. He has been quoted in leading publications such as the Wall Street Journal and Bloomberg Businessweek and has been interviewed on CNBC, Bloomberg TV and Fox Business Network.

Dr. Weisbart has taught as an adjunct professor at the School of Risk Management, Insurance, and Actuarial Science in the Tobin College of Business at St. John's University.
## 2013 CIPR Summit: Participant List

<p>| 1. Anderson, Mel              | Deputy Commissioner for Financial Regulation/Audit | Arkansas Ins Dept |
| 2. Angelina, Mike             | Executive Director, Academy of Risk Management &amp; Ins | Saint Joseph’s University |
| 3. Armstrong, Jim             | Deputy Insurance Commissioner                     | Iowa Ins Div |
| 4. Barratt, Brett             | Deputy Commissioner                                | Utah Ins Dept |
| 5. Barry, Michael             | Vice President, Media Relations                    | Insurance Information Institute |
| 6. Bennett, Nancy             | Senior Life Fellow                                 | American Academy of Actuaries |
| 7. Bernard, Susan             | Chief Examiner                                     | California Dept of Ins |
| 8. Bieniek, Joe               | Vice President &amp; Senior Consultant                 | First Consulting &amp; Administration, Inc. |
| 9. Boemer, Mike               | Director Actuarial Office, Financial Regulation Division | Texas Dept of Ins |
| 10. Brandenburg, Aaron        | Economist &amp; Statistical Information Manager        | NAIC |
| 12. Broadie, Steve            | VP - Financial Policy                              | PCI |
| 13. Bruning, Larry            | International Life Actuary                         | NAIC |
| 14. Byrd, Warren              | Executive Counsel                                  | Louisiana Dept of Ins |
| 15. Calderon, Ramon           | Director                                           | NAIC |
| 16. Carlos, John              | Regulatory Programs Administrator                  | Guam Regulatory Division |
| 17. Chow, Andrew              | Insurance Examiner                                 | Hawaii Ins Div |
| 18. DeFrain, Kris             | Director, Research and Actuarial Services          | NAIC |
| 20. Edwards, Reid             | Senior Director Global Government Affairs         | RMS |
| 21. Eppstein, David           | Assistant Vice President                           | PIA National |
| 22. Fraser, Diane             | Senior Policy Advisor                              | US Dept of the Treasury |
| 23. Gackenbach, Julie         | Principal                                           | Confrere Strategies |
| 24. Gmeiner, Kathleen         | Project Director                                   | UHCAN OH |
| 25. Haggard, Brenda           | Manager of Financial Analysis                      | Arkansas Ins Dept |
| 26. Hall, Shanique            | CIPR Manager                                       | NAIC |
| 27. Hanna, Craig              | Director of Public Policy                          | American Academy of Actuaries |
| 28. Harris, Andrew            | President                                          | PIA National |
| 29. Hartz, Doug               | Principal Consultant                               | IRCG |
| 30. Jacobi, Jill              | Senior Attorney                                    | California Dept of Ins |
| 31. Juliff, Sara              | Analyst                                            | NAIC |
| 32. Kiser, Todd               | Commissioner                                       | Utah Insurance Department |
| 33. Knighten, Arlene          | Deputy General Counsel                             | Louisiana Dept of Ins |
| 34. Leong, Jessica            | SVP and Lead Casualty Specialty Actuary            | Guy Carpenter |
| 35. Martinez, Raymond         | Senior Deputy Commissioner                          | North Carolina Dept of Ins |
| 36. Mayost, Daniel            | Modeling Specialist                                | Office Of The Superintendent Of Financial Institutions |
| 37. McNair-Grove, Sarah       | Actuary                                            | Alaska Division of Ins |
| 38. Motil, Michael            | President                                          | Motil Consulting Inc |
| 39. Nelson, Benjamin          | CEO                                                | NAIC |
| 40. Neve, Dave                | VP, Capital Management                             | Aviva USA |
| 41. Obersteadt, Anne          | Senior Researcher, CIPR                             | NAIC |
| 42. Odiorne, James            | Chief Deputy Commissioner                           | Washington Ofc of the Ins Cmsr |</p>
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<th>Name</th>
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Session 1:
Impacts of Current Liability Reporting
NAIC’s Center for Insurance Policy and Research Summit: Exploring Insurers’ Liabilities

Session 1:
Impacts of Current Liability Reporting

Michael E. Angelina, ACAS, MAAA, CERA
Vice President, Casualty Practice Council
August 27, 2013

About the American Academy of Actuaries

The American Academy of Actuaries is a 17,000-member professional association whose mission is to serve the public and the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualifications, practice, and professionalism standards for actuaries in the United States.

- Deficient Loss Reserves: 36%
- Rapid Growth: 17%
- Alleged Fraud: 9%
- Overstated Assets: 8%
- Catastrophic Losses: 7%
- All Significant Change: 5%
- Reinsurance Failure: 4%
- Impairment of an Affiliate: 4%
- All Other: 10%

Understanding Liabilities – Importance

- Reserves remain largest risk on a company’s balance sheet
- Inadequate reserves most likely cause of P&C insurance company insolvencies
- Large percentage of recorded liabilities on balance sheet
- Subject to much historical volatility (fairly or unfairly)
  - Mostly casualty but also property (catastrophe related)
- Need to focus on drivers of variability
Understanding Liabilities – Importance

- Benefits to management and external reviewers:
  - Give rise to more informed capital adequacy decisions
  - Understanding of risk/reward tradeoffs for certain lines of business
  - Facilitate better discussions regarding culture of management
    - Book a point estimate or range – where in the range is booked estimate?
  - Identify points of interest from quarterly close process
    - Reserve increases or releases
  - Improved communications with board of directors around Own Risk & Solvency Assessment

Historical Volatility of Reserves

- Reserves by their nature are volatile for many reasons
  - Inability to identify changing trends
    - Propensity to sue, judicial reforms, medical inflation, societal attitudes
  - Reinsurance issues
    - Inadequate amount, misunderstanding of coverage, potential for dispute
  - Misestimating where insurance industry was in the pricing cycle
    - Primary rate change, tort costs, focus on production vs. underwriting
  - Shocks to the system
    - Legislative reforms, asbestos and pollution, aggregation of exposures
  - Focus on lessons learned
    - Appreciate the possibility for history to repeat itself
      - Why is this time different?
    - Beyond traditional methods and analyses
Historical Reserving Errors – Excess of Loss Reinsurance

Percentage Difference Between 12/60 Month Estimates and Ultimate (Sch P – Reinsurance B)


12 Month Error 60 Month Error

Measuring and Understanding Liabilities

- Reserving Process
  - More than estimation, adequacy, and profitability
  - Feedback mechanism on underwriting process and claims adjusting
  - Strong opportunity for management to communicate results and focus on what causes results and potential favorable/adverse events

- Drivers of Reserves – Identification
  - Adverse claims trends
  - Leading indicators
    - Claim frequency, large loss notices, industry information, ceded issues
  - Hyper correlation of exposures (credit crisis)
  - Large policy limits in targeted sectors
  - Poor underwriting strategy/inadequate handle on pricing
Impacts of Current Liability Reporting

For more information, contact Lauren Pachman, Casualty Policy Analyst
Pachman@actuary.org
(202) 223-8196
Series of good years…

…followed by a series of bad years
Years that go bad….

…keep getting worse
Cycle – Homeowners

Accident Year

Booked Ultimate Loss (t) / Booked Ultimate Loss (12)

Cycle – Company A

Accident Year

Sum of: Priv Pass Auto, Comm Auto Liab, CMP, Home, Med Prof Liab, Other Liab, Prod Liab, WC. Data to 12/2009 is from cleaned Schedule P database from Guy Carpenter & Risk Lighthouse (representing more than 95% of the industry). Red line = company’s booked ultimate loss & ALAE at 120 months / at 12 months where possible.
Cycle – Company B

Sum of: Priv Pass Auto, Comm Auto Liab, CMP, Home, Med Prof Liab, Other Liab, Prod Liab, WC. Data to 12/2009 is from cleaned Schedule P database from Guy Carpenter & Risk Lighthouse (representing more than 95% of the industry). Red line = company’s booked ultimate loss & ALAE at 120 months / at 12 months where possible.

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Reserve Cycle by line of business

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Reserve Cycle – Workers Compensation

Booked Ultimate Loss (N) / Booked ultimate Loss (12)

Accident Year

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Workers Compensation Loss Ratio at 12 months

Paid LR

Case LR

Paid LR
Reserve Cycles

- Two features:
  - Years that go bad keep getting worse
  - It’s a cycle!

- Lots of correlation:
  - Between companies
  - Between LOBs
  - Between countries

- Caused by changes in calendar year trends like inflation (?)

GC Analytics Disclaimer

The data and analysis provided by Guy Carpenter herein or in connection herewith are provided "as is", without warranty of any kind whether express or implied. The analysis is based upon data provided by the company or obtained from external sources, the accuracy of which has not been independently verified by Guy Carpenter. Neither Guy Carpenter, its affiliates nor their officers, directors, agents, modelers, or subcontractors (collectively, "Providers") guarantee or warrant the correctness, completeness, currentness, merchantability, or fitness for a particular purpose of such data and analysis. The data and analysis is intended to be used solely for the purpose of the company internal evaluation and the company shall not disclose the analysis to any third party, except its reinsurers, auditors, rating agencies and regulators, without Guy Carpenter’s prior written consent. In the event that the company discloses the data and analysis or any portion thereof, to any permissible third party, the company shall adopt the data and analysis as its own. In no event will any Provider be liable for loss of profits or any other indirect, special, incidental and/or consequential damage of any kind howsoever incurred or designated, arising from any use of the data and analysis provided herein or in connection herewith. Statements or analysis concerning or incorporating tax, accounting or legal matters should be understood to be general observations or applications based solely on our experience as reinsurance brokers and risk consultants and may not be relied upon as tax, accounting or legal advice, which we are not authorized to provide. All such matters should be reviewed with the client's own qualified advisors in these areas. This presentation (report, letter) is not intended to be a complete actuarial communication. Upon request, we can prepare one. We are available to respond to questions regarding our analysis.

There are many limitations on actuarial analyses, including uncertainty in the estimates and reliance on data. We will provide additional information regarding these limitations upon request.

As with any actuarial analysis, the results presented herein are subject to significant variability. While these estimates represent our best professional judgment, it is probable that the actual results will differ from those projected. The degree of such variability could be substantial and could be in either direction from our estimates.

The estimated cash flows may vary significantly from amounts actually collected, particularly in the event that a reinsurer is unwilling or unable to perform in accordance with the terms of the reinsurance contract.
Reserve Cycle – U.S. Workers Compensation
Incurred chain-ladder cycle uses an all year weighted average of 10x10 year Incurred Loss & ALAE triangles (paid + case reserve). Data to 12/2011 is from cleaned Schedule P database from Risk Lighthouse, and updated for 12/2012 using data supplied by Dowling.
Incurred chain-ladder cycle uses an all year weighted average of 10x10 year Incurred Loss & ALAE triangles (paid + case reserve). Data to 12/2011 is from cleaned Schedule P database from Risk Lighthouse, and updated for 12/2012 using data supplied by Dowling.

Incurred BF cycle uses an all year weighted average of 10x10 year Incurred Loss & ALAE triangles (paid + case reserve). Data to 12/2011 is from cleaned Schedule P database from Risk Lighthouse, and updated for 12/2012 using data supplied by Dowling.
Presentation Outline

Do P/C Underwriting Results Go in Cycles?
- Differences by Line of Business

What Drives These Cycles?
- Claim Trends
- Capital/Capacity
- Reinsurance Usage
- Pricing
- Inflation
Do P/C Underwriting Results Go in Cycles?


"Hard" market: NWP grew by double digits, driving down this ratio

*to Net Premiums Earned
**Loss + LAE Ratio*, 1983-2011: Homeowners Insurance**

*to Net Premiums Earned  

**PP Auto & HO Insurance Loss + LAE Ratio*, 1983-2011**

*to Net Premiums Earned  
Loss + LAE Ratio*, 1983-2011:
Workers Compensation Insurance

Loss + LAE Ratio*, 1983-2011:
Medical Malpractice Insurance

*to Net Premiums Earned
Loss + LAE Ratio*, 1983-2011:
Commercial Multiple Peril Insurance

WC, CMP, Med Mal:
Loss + LAE Ratio*, 1983-2011

The underwriting cycles vary by line of business and are loosely "in sync" with each other.

*to Net Premiums Earned
Cycles, Cycles (Nearly) Everywhere

<table>
<thead>
<tr>
<th>Country</th>
<th>Cycle Length in Years*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Netherlands</td>
<td>12.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>12.0</td>
</tr>
<tr>
<td>France</td>
<td>10.2</td>
</tr>
<tr>
<td>Singapore</td>
<td>7.8</td>
</tr>
<tr>
<td>United States</td>
<td>7.4</td>
</tr>
<tr>
<td>Japan</td>
<td>7.1</td>
</tr>
<tr>
<td>Canada</td>
<td>5.8</td>
</tr>
<tr>
<td>Spain</td>
<td>5.7</td>
</tr>
<tr>
<td>Australia</td>
<td>5.2</td>
</tr>
<tr>
<td>Italy</td>
<td>4.8</td>
</tr>
<tr>
<td>Austria</td>
<td>None</td>
</tr>
<tr>
<td>Denmark</td>
<td>None</td>
</tr>
<tr>
<td>S. Korea</td>
<td>None</td>
</tr>
<tr>
<td>Taiwan</td>
<td>None</td>
</tr>
</tbody>
</table>


Cyclicality in Premiums, Reserves, and Profits
Net Premium Growth: Annual Change, 1971—2013:Q1

(Percent)

1975-78 1984-87 2000-03

Shaded areas denote “hard market” periods
Sources: A.M. Best (historical and forecast), ISO, Insurance Information Institute.

Net Written Premiums Fell 0.7% in 2007 (First Decline Since 1943) by 2.0% in 2008, and 4.2% in 2009, the first 3-Year Decline Since 1930-33.

2013:Q1 = 4.1%
2012 growth was +4.3%

P/C Reserve Development, 1992–2015E

Note: 2005 reserve development excludes a $6 billion loss portfolio transfer between American Re and Munich Re. Including this transaction, total prior year adverse development in 2005 was $7 billion. The data from 2000 and subsequent years excludes development from financial guaranty and mortgage insurance.
Sources: A.M. Best, ISO, Barclays Research (estimates).
Profitability Peaks & Troughs in the P/C Insurance Industry, 1975 – 2013:Q1*

*Profitability = P/C insurer ROEs. 2011-13 figures are estimates based on ROAS data. Note: Data for 2008-2013 exclude mortgage and financial guaranty insurers.

Source: Insurance Information Institute; NAIC, ISO, A.M. Best.

History suggests next ROE peak will be in 2016-2017

1977: 19.0%
1987: 17.3%
1997: 11.6%
2006: 12.7%
2013:Q1 9.7%

What Drives These Cycles?

• Claim Trends
• Capital/Capacity
• Reinsurance Usage
• Pricing
• Inflation
Monthly Change* in Auto Insurance Prices, 1991–2013*

*Percentage change from same month in prior year; through June 2013; seasonally adjusted
Note: Recessions indicated by gray shaded columns.
Sources: US Bureau of Labor Statistics; National Bureau of Economic Research (recession dates); Insurance Information Institutes.

Cyclical peaks in PP Auto tend to occur roughly every 10 years (early 1990s, early 2000s and likely the early 2010s)

“Hard” markets tend to occur during recessions

Pricing peak occurred in late 2010 at 5.3%, falling to 2.4% by Mar. 2012

The June 2013 reading of 3.9% is up from 3.0% a year earlier

---


Claims Paid per 100 Exposures

CAT-related claims → Non-CAT-related claims

Gradually growing frequency of non-cat claims since 2005

CAT claim frequency is variable but generally rising

Sources: Insurance Research Council, “Trends in Homeowners Insurance Claims,” p.29; Insurance Information Institute
P/C Industry Homeowners Average Claim Severity, 1997-2011

HO average claim severity is now three times what it was in 1997 (a 200% increase). In that span, the CPI rose only 40%.


EEOC Workplace Discrimination Complaints, FY1997-FY2012*

Biggest jumps in FY2008 complaints came for retaliation and age discrimination. But FY2008 excluded the worst of the recession.

*The federal fiscal year runs from Oct 1 of a given year to Sept 30 of the following year. The year is designated by its endpoint. Thus FY2009 covers the period from Oct 1, 2008 through Sept 30, 2009.

Sources: EEOC at http://www.eeoc.gov/stats/charges.html ; I.I.I.
US Policyholder Surplus: 1975–2013*

(S $ Billions)

Surplus as of 3/31/13 was a record $607.7, up 3.6% from $586.9 of 12/31/12, and up 39.0% ($170.6B) from the crisis trough of $437.1B at 3/31/09. Pre-crisis peak was $521.8 as of 9/30/07. Surplus as of 3/31/13 was 16.5% above 2007 peak.

“Surplus” is a measure of underwriting capacity. It is analogous to “Owners Equity” or “Net Worth” in non-insurance organizations.

The Premium-to-Surplus Ratio Stood at $0.77:1 as of 3/31/13, A Near Record Low (at Least in Recent History)*

* As of 3/31/13.

Global Reinsurance Capital, 2007-2012

2007-2012 compound average growth rate: 4.3%
High Global Catastrophe Losses Have Had a Modest Adverse Impact on Global Reinsurance Market Capacity

Source: Aon Reinsurance Market Outlook, April 2013 Update from Individual Company and AonBenfield Analytics; Insurance Information Institute.
Other Possible Cycle Drivers

- Sudden Changes in the Marketplace
  - Such as a wave of mergers, major new entrants, etc.
- Regulatory Approval Lags
- Tort System Shocks
- Investment Shocks
  - Such as massive capital losses due to interest rate spikes, stock market plunge, etc.

Insurance Information Institute

www.iii.org

Thank you for your time and your attention!
Session 2:  
Property/Casualty Panel
Accounting Requirements

P&C Loss & Premium Reserves

- **Loss & Loss Expense Reserves**
  
  For each line of business and for all lines of business in the aggregate
  
  Management shall record its **BEST ESTIMATE** of its liabilities for unpaid claims, unpaid losses, and loss/claim adjustment expenses.
  
  Typically, this is the **Ultimate Settlement Value (Limited Discounting)**

- **Unearned Premium Reserve**

- **Premium Deficiency Reserve**
Financial Statement Requirements

P&C Actuarial Responsibilities
- Statement of Actuarial Opinion (public)
- Actuarial Opinion Summary (regulator only)
- Actuarial Report (company, regulatory access)

P&C Actuarial-ish Responsibilities
- Schedule P (accident year loss and LAE data; loss development)

Actuarial Opinion – What Can It Tell Me?
- Actuarial Opinion
  - Booked loss & premium reserves
- Loss Reserve considerations
  - Change in mix of business or operations
- Significant risk: material adverse deviation
  - Solvency warnings
- Reinsurance
  - retroactive, financial, collectability
- IRIS (Reserve) Ratios 11-13
  - exceptional values
### Schedule P – Loss Ratios

<table>
<thead>
<tr>
<th>Accident Year</th>
<th>Loss &amp; Loss Expense % (Incurred / Premiums Earned)</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior</td>
<td>xxx</td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>95%</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>98%</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>102%</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>70%</td>
<td></td>
</tr>
</tbody>
</table>

*Sch. P, Part 1, Column 31*

---

### Schedule P – Reinsurance

<table>
<thead>
<tr>
<th>Accident Year</th>
<th>Loss &amp; Loss Expense % (Incurred / Premiums Earned)</th>
<th>Direct &amp; Assumed</th>
<th>Ceded</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2001</td>
<td>60%</td>
<td>75%</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>60%</td>
<td>77</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td>59%</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>58%</td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>57%</td>
<td>82</td>
<td></td>
</tr>
</tbody>
</table>

*Sch. P, Part 1, Cols. 29-30*

*Schedule P is after intercompany pooling so you can see the reinsurance impact.*
**IRIS Ratios 11, 12, 13**  
“Development” from Schedule P, Part 2

<table>
<thead>
<tr>
<th>Accident Year*</th>
<th>Net Incurred at Year End</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20x3</td>
<td>20x4</td>
</tr>
<tr>
<td>Prior</td>
<td>390</td>
<td>395</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20x2</td>
<td>390</td>
<td>420</td>
</tr>
<tr>
<td>20x3</td>
<td>450</td>
<td>480</td>
</tr>
<tr>
<td>20x4</td>
<td>530</td>
<td>535</td>
</tr>
<tr>
<td>20x5</td>
<td>500</td>
<td>XXX</td>
</tr>
</tbody>
</table>

*Note: Some lines in Sch. P are not A.Y.*

- IRIS 11: 1-year Loss Development to Prior Year Policyholder Surplus
- IRIS 12: 2-year Loss Development to 2nd Prior Year Policyholder Surplus
- IRIS 13: Estimated Current Reserve Deficiency to Prior Year Policyholder’s Surplus
- Unusual Values – Explanation is found in the Actuarial Opinion documents.

---

**Actuarial Loss Development Analyses Can Be Performed**

<table>
<thead>
<tr>
<th>Accident Year</th>
<th>Cumulative Paid Losses at Age</th>
<th>Estimated Ultimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>2002</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>2003</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>2004</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>2005</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Schedule P Reserve Analyses – Major Pitfalls

- Not enough information to judge:
  - tail factors – 10+ Years
  - most recent accident year
- Not always the best data segregation
- Not restated for changes in reinsurance program, rates, laws, contracts, etc.

These are more “public use” problems -- Regulators have access to the confidential Actuarial Reports.
NAIC’s Center for Insurance Policy and Research Summit: Exploring Insurers’ Liabilities

Session 2: Property/Casualty Panel

Michael E. Angelina, ACAS, MAAA, CERA
Vice President, Casualty Practice Council
August 27, 2013

About the American Academy of Actuaries

The American Academy of Actuaries is a 17,000-member professional association whose mission is to serve the public and the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualifications, practice, and professionalism standards for actuaries in the United States.
Historical Reserving Errors – Excess of Loss Reinsurance

Percentage Difference Between 12/60 Month Estimates and Ultimate (Sch P – Reinsurance B)

Understanding Liabilities – Look Inside the Company

Interactions with Actuaries

- Internal actuaries – management’s best estimate (booked) vs. actuarial estimate
  - Are there biases in actuarial estimate or process?
  - How do estimates move?
  - Reserving philosophy of the company
    - Book the low end, book above actuarial best estimate
    - Management, reserve department, pricing, underwriting, and claims input

- Actuaries within the audit firm
  - Necessary check and balance (should be value added versus a mechanical exercise)
  - Provide external view that company actuaries may miss
  - Reflect competitor behavior/actions
Understanding Liabilities – Look Inside the Company

**Interactions with Actuaries (continued)**

- **Outside actuaries (external consultants)**
  - Independent viewpoint – most helpful if unbiased
    - Engaged by management or Board
  - Provide further external view and typically more detailed analysis
  - Enable company to better understand signal versus noise from auditors
    - Two external points versus one

- **Best practice is to have a session with all three actuaries to discuss differences at an appropriate level of detail**
  - Focus on both overall difference, and cells where there might be offsetting differences

---

Understanding Liabilities – Interpreting the Actuarial Dialogue

- **Statement of Actuarial Opinion**
  - Scope of Opinion – what is in/out
    - Ceded to international affiliates; look for consolidation
  - Understand disclosures
    - Risk of Material Adverse Deviation and Relevant Comments on risks and uncertainties
  - Multiple jurisdictions – who is signing the various parts
Understanding Liabilities – Interpreting the Actuarial Dialogue

- Considerations and disclosures
  - Uncertainty – both ways
    - What are the pockets of adverse uncertainty?
    - What are areas that you feel are “rock solid” and why?
    - New businesses or products being written
  - Historical development
    - What is company track record?
    - Has anything changed (company philosophy or actuarial estimation)?
      - Hard market versus soft market philosophy (prudence)
      - Presence or absence of catastrophe losses (attributional incurred but not reported [IBNR])
    - Unbiased indication – actuarial estimate versus unbiased estimate
      - Track difference over time
  - Industry trends/competitor behaviors
    - Current year loss ratio relative to prior years (considering market conditions)
    - “Word on the street” or earnings calls

Understanding Liabilities – Divide and Conquer

- Categorize reserves in broad categories for discussion
- Focus discussion with management on big issues
  - Short tail (catastrophe versus non-cat)
    - Current accident year, prior accident year, all prior
    - Case outstanding (O/S) to IBNR ratios; IBNR to earnings/price (EP) ratios
  - Liability business
    - Reinsurance (excess vs. proportional)
    - Primary (excess and umbrella versus first dollar)
    - Separate outlier segments (personal auto, workers’ compensation, contractors)
    - Loss ratio for recent years; IBNR to case O/S for older years
    - Actual versus expected and actuarial reaction
    - Comparison to industry expectation
  - Large reserves groups
    - Asbestos, construction defects, pollution, credit crisis, catastrophes
    - Relevant metrics: survival ratios, exposure analyses, large movements
  - Other – good, understandable definitions
    - Catastrophe exposed lines with no events, personal accident, etc.
Understanding Liabilities – Divide and Conquer

- Booked vs. actuarial estimates
  - Internal vs. external actuaries
    - LISTEN – signal versus noise
- Changes in actuarial estimate vs. unbiased estimate
- Be in a position to have a good dialogue – small group

Measuring and Understanding Liabilities (numbers used below are hypothetical)

- Majority of reserves are at a medium risk level
- Broad category composition is as follows:
  - High Risk – certain casualty classes
  - Medium-High – treaty casualty, excess and umbrella casualty
  - Medium – some casualty (claims made) and property lines
  - Medium-Low – reinsurance property lines
  - Low Risk – auto physical damage, accident and health, losses booked at policy limits

<table>
<thead>
<tr>
<th>Category</th>
<th>Total</th>
<th>Low Risk</th>
<th>Medium-Low</th>
<th>Medium</th>
<th>Medium-High</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1,621</td>
<td>3,359</td>
<td>2,786</td>
<td>2,798</td>
<td>718</td>
<td>198</td>
</tr>
<tr>
<td>AY 2008-2012</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP</td>
<td>9,072</td>
<td>67%</td>
<td>67%</td>
<td>67%</td>
<td>67%</td>
<td>67%</td>
</tr>
<tr>
<td>IBNR</td>
<td>2,124</td>
<td>13%</td>
<td>13%</td>
<td>13%</td>
<td>13%</td>
<td>13%</td>
</tr>
</tbody>
</table>
Understanding Liabilities – Impact on Pricing

- Does company perform robust price monitoring?
  - Identifying changes in terms and conditions – directional more than decimal point precision
    - Strong versus slight or moderate

- How is feedback mechanism valued?
  - Reserving versus pricing information (underwriting ratios, higher frequency of claims than normal)
  - Incorporating the historical performance
    - Priced versus booked ultimate loss ratios, rate changes relative to historical results

- Is there general understanding of the relative risk of the business – qualitatively?
  - Deployment of capital, consumers of capital
    - Diversification for diversification’s sake does not make economic sense
  - Has company made the tough but easy calls with regard to high risk business?

- Is there an appreciation for learning from the past?
  - Rate changes were grossly understated, creative coverages, too much reliance on experience rating/ignoring exposure rating

- How does the company identify the current market conditions?
  - External publications, feedback from industry events

- Is there evidence of a disciplined process?
  - Team approach (underwriting, claims, actuarial pricing)
  - Separate the technical pricing from the underwriting decision and/or business decision
    - Actuarially-priced loss ratio gets booked
Property/Casualty Panel

For more information, contact Lauren Pachman, Casualty Policy Analyst
Pachman@actuary.org
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Session 3:
Life Panel
U.S. Insurance Regulation
Evolution Toward Principle-Based Reserving

Larry J. Bruning FSA, MAAA
Life Actuary
NAIC

New Reserve Developments

• Principle-Based Valuation (PBV)
  1. Eliminate weakness in current formula based system
  2. Increase in product complexity & benefit options
  3. Eliminates need to constantly develop new formulas and rule combinations
  4. "One size fits all" does not adequately measure or assess risk
  5. Need to focus on "what could happen" rather than "what did happen"

• Good Public Policy
  1. Improves price of products for consumers by "right sizing" reserves
  2. Reserve based on all risks in the insurance contract
  3. Company uses "own risk profile" rather than "industry average risk profile"

• Consistent with International Developments
  1. PBV is consistent with economic valuations
  2. Levels playing field Globally
Existing Legal Framework

- Standard Valuation Law (State Legislatures)
- Regulations issued by State Insurance Departments
- Actuarial Guidelines developed through NAIC process
- Case Law of Federal and State Courts

New Legal Framework

- Amended Standard Valuation Law (State Legislatures)
- Valuation Manual (NAIC Process)
- Case Law of Federal and State Courts
New Legal Framework

- Development Phase Completed
- Implementation Phase Underway

Implementation Phase

- NAIC Structure Changes
- State Legislative Adoption of Amended Laws Update
- Development of a Statistical Agent Framework
- Develop Education and Training for Regulatory Staff
- Address State Regulatory Resource Issues to Implement and Operate PBR
- Update Blanks, Financial Analysis, Examination Handbooks
- Recommend Accreditation Standard for PBR
NAIC Structure Changes

- Plenary Committee
- Executive Committee
- Principle-Based Reserving Implementation Task Force
- Life Insurance and Annuities
  - A-Committee
- Health Insurance and Managed Care
  - B-Committee
- Financial Condition
  - E-Committee
- Financial Regulation Standards & Accreditation
  - F-Committee

2013 State Legislative Adoption
Source: ACLI (June 25, 2013)

- 7 States have adopted legislative package
  - Arizona
  - Indiana
  - Louisiana
  - Maine
  - New Hampshire
  - Rhode Island
  - Tennessee
2013 State Legislative Adoption
Source: ACLI (June 25, 2013)

- Additional State Activity
  - Connecticut – Bill died upon adjournment
  - New Mexico – Bill died upon adjournment
  - Texas – Bill died upon adjournment

Principle-Based Valuation Methodology

- Applies to new business issued on and after implementation date per SVL
- Focused on all benefits and material risks
- Incorporates use of Financial Model
- Quantifies tail risk, if any, as a function of scenario reserves
- Function involves Conditional Tail Expectation Metric
- Reflects credible company experience data
- Requires margins for uncertainty
Principle-Based Valuation Methodology

- Scenario Reserve:
  1. Requires use of financial model that projects asset and liability cash flows
  2. Requires use of Economic Scenario Generator
  3. Number of economic scenarios (1,000 – 10,000+)
  4. Stochastic scenario consists of interest rates and/or equity returns over model time horizon (30+ years)
  5. Greatest Present Value of Accumulated Deficiency (GPVAD) over model time horizon
  6. Scenario Reserve = Starting Assets + GPVAD

Statistical Agent Framework

- Section 13 of Standard Valuation Law:
  A company shall submit mortality, morbidity, policyholder behavior, or expense experience and other data as prescribed in the valuation manual.

- Valuation Manual
  1. VM – 50 Experience Reporting Requirements Statistical Agent
  2. VM – 51 Experience Reporting Formats/Statistical Plans

- Experience Data
  1. Statistical Agents to collect data
  2. Industry Experience Data Tables
  3. Experience Data Benchmarks
  4. NAIC Warehouse
Implementation Issues

Mike Boerner, ASA, MAAA
Director, Actuarial Office, Financial
Texas Department of Insurance

PBR Implementation Issues
For Companies

- Time needed to adjust systems and adapt to new PBR requirements.
- PBR complexity and calculation rigor especially for smaller companies with simpler products and less risk.
Provisions To Help With PBR Implementation
Issues For Companies

- Valuation Manual (VM) provides a three year phase in during which companies can elect not to apply PBR.
- Single state exemption.
- VM exempts some simpler products from PBR.
- VM provides exclusion tests to identify and exempt other simpler products with less risk from PBR.

Stochastic Reserve (SR) Exclusion Tests

Products can be excluded from the SR if:

- Certification provided by qualified actuary of no material interest rate risk or asset return volatility risk (cannot be used for certain products); or
- Stochastic exclusion ratio test is passed; or
- Demonstration provided that reserves will not increase under stochastic requirements.
**Deterministic Reserve Exclusion Test**

- Products can be excluded from the deterministic reserve requirements if the sum of the net valuation premiums are less than the sum of the corresponding gross premiums.
- Cannot be used for universal life products with secondary guarantees or for products required to calculate the stochastic reserve.

---

**PBR Implementation Issues For Regulators**

- Regulatory Review of PBR
- Development of Tools & Information to Support Review
- Consistency in PBR Review Across States
- PBR Reporting in Blanks
- State Regulatory Resources
- Training
PBR Review (EX) WG Charges Include

- Develop framework for development of risk-focused analysis/examination/actuarial procedures for PBR.
- Develop review tools, identify data needed for review and propose means to obtain the data.
- Draft charges and operating procedures for new PBR Valuation Analysis (E) Working Group.
- Recommend modifications in Blanks and reporting instructions for PBR.
- Identify ideal staffing resources for PBR reviews, including ideal NAIC assistance, and any new financial modeling or software reviewers.

Training – PBR Implementation (EX) Task Force Charges Include:

- Action: Train regulators to implement PBR and partner with company representatives and interested parties to prepare for PBR Implementation.
- Regulatory Training: Identify regulatory educational training needs, develop case studies, and work with NAIC staff to develop training courses.
- Company Outreach: Identify company educational needs, work with interested parties to develop company training, consider performing a pilot project much like was done for ORSA.
- Actuarial Continuing Education: Work with interested parties to develop continuing education if on-going PBR actuarial training is required by regulators.
Implementation of PBR & VM

- Adoption of Enabling Standard Valuation Law (SVL)
- Process Change Efficiencies Enabled by Adoption of SVL.

Super Majority Vote Required For VM to Become Operative

VM becomes operative on January 1 following:

1) SVL legislative enactment by at least 42 of the 55 jurisdictions listed in SVL (50 States, American Samoa, American Virgin Islands, District of Columbia, Guam, and Puerto Rico); and

2) SVL legislative enactment by states representing greater than 75% of direct premiums written as provided by the SVL; and

3) NAIC adoption of VM by 42 members or 75% of members voting, whichever is greater.
Process Change Efficiencies

- Greater state uniformity in reserve requirements.
- More efficient implementation of reserve requirements.
- Same cite, same timing.
- VM reserve changes automatically satisfies 26 state tax qualified reserve requirement.
- Accounting Practices and Procedures Manual (APPM) to reference VM requirements with same timing. APPM state adoption requirement always met.
- Results in efficiencies for both regulators & companies.
NAIC’s Center for Insurance Policy and Research Summit: Exploring Insurers’ Liabilities

Session 3: Life Panel
Issues with Internal Modeling

Dave Neve, FSA, MAAA, CERA
Chairperson, American Academy of Actuaries
Life Financial Soundness / Risk Management Committee

Overview of PBR

- Insurers set aside funds, or reserves, to pay insurance claims when due.
- Currently, one-size-fits-all formulas are used to determine statutory reserves, as prescribed by state law and regulations.
- Principle-based Reserving, or PBR, replaces the current statutory formulaic approach with an approach that better aligns policy reserves with product risks and the risk practices of the company.
  - To improve accuracy of reserves, PBR reserve assumptions move away from using industry-wide averages to using a company’s own experience for risks such as mortality, policyholder behavior, and expenses.
  - Also reflects the impact on the reserves under a variety of future economic conditions, such as interest rate movements, equity returns and asset defaults.
  - Requires the use of a robust asset and liability cash flow model.
Why is PBR Needed?

- Reserve requirements need to evolve to keep pace with new product designs. The formulaic approach prescribed by state laws and regulations needs to be updated as new designs are introduced.
- Current formulas do not always accurately reflect the liabilities held on policies. For some products this leads to excessive conservatism in reserve calculations and for others it results in inadequate reserves.
  - Reserves higher than necessary result in higher costs to consumers.
  - Reserves that are too low can put companies at greater risk of future insolvency, with lower protection to consumers.
- The current system locks in certain assumptions, not adjusting as experience and economic conditions change.
- The improved alignment is expected to reduce redundant reserves for some products and increase inadequate reserves for products where significant product risks are not captured by the current reserve valuation methodology.

Importance of Cash Flow Models

- For some risks, modeling the range of outcomes under multiple possible economic conditions is the only way to appropriately reflect the risk in the reserve.
- A credible and robust cash flow model is an essential element for PBR.
- Many companies will use their cash flow testing model for PBR; some modifications may be needed to fully comply with PBR.
Cash Flow Models

Types of models
- Company-developed models versus commercial models (i.e., vendor)
- Grouped versus seriatim models
- Asset versus liability models

Basic elements
- Listing of inforce policies
- Listing of asset holdings backing the inforce policies
- Modeling assumptions
- Customization to vendor software to reflect unique product features

Reserve Valuation Assumptions

Under PBR, valuation assumptions will fall into one of two categories:
- Prescribed Assumptions
  - Includes stochastically generated assumptions for interest rate movements and equity returns.
- Prudent Estimate Assumptions
Prescribed Assumptions

- **Prescribed assumptions** are used for risks where the company has very little or no influence or control over the outcome.
- For these types of risks, all companies will be required to use the same assumptions.
- Examples:
  - Interest rate movements
  - Equity movements
  - Asset default experience
  - Spreads on new asset purchases

Prudent Estimate Assumptions

- **Prudent estimate assumptions** are used where the company practice has some degree of influence on the outcome of the risk factor.
- The resulting valuation assumptions for this category could differ by company, reflecting the different risk profiles of the company.
- Equals the actuary’s best estimate of the future (i.e., “Anticipated Experience”) plus a margin that includes a provision for adverse deviation and estimation error.
- Examples:
  - Mortality
  - Lapse
  - Partial Surrender
  - Expenses
  - Premium funding patterns
Minimum Reserve under VM-20

- Three components:
  - Net Premium Reserve (NPR) - calculated seriatim and summed
  - Deterministic Reserve (DR) - calculated in the aggregate
  - Stochastic Reserve (SR) - calculated in the aggregate

- The Minimum Reserve equals the greater of the three, compared in the aggregate, with an adjustment for any deferred premium asset.

- The adjustment for the deferred premium asset grosses up the SR or the DR if the SR or DR is greater than the NPR.

- The company may elect to exclude one or more groups of policies from the SR and/or the DR requirements if prescribed exclusion tests are passed.

Net Premium Reserve

- Serves as a minimum floor.
- Uses only prescribed assumptions (not company experience assumptions).
- Conforms the reserve methodology to comply with the tax code.
- A seriatim calculation.
- Comparison is made to the Cash Surrender Value.
The Deterministic Reserve

- Based on a Gross Premium Valuation methodology (present value of benefits and expenses less the present value of premium and other inflows).
- Uses cash flow model to project revenue, benefits, and expenses.
- Was initially a seriatim (policy by policy) calculation, with a comparison to the cash surrender value for each policy.
- Is now an aggregate reserve, and the company can group policies into modeling cells to project future cash flows.
- Cash flows are projected in compliance with the requirements of VM-20.

Deterministic Reserve Calculation

- Cash flows are projected under a single prescribed economic scenario (interest rate movements and equity returns).
- Present Values are calculated using discount rates that equal the path of projected Net Asset Earned Rates (i.e., the company’s projected portfolio rate).
- Different Net Asset Earned Rates are determined for each “model segment” that reflect the company’s investment strategies for different products.
- Net Investment Income is not included in the cash flows; investment earnings are reflected in the reserve via the discount rate.
The Stochastic Reserve

- **Similarities to the Deterministic Reserve:**
  - Both use cash flow models
  - Both use the same assumptions for non-economic assumption (mortality, policyholder behavior, expenses) with a few exceptions

- **Differences from the Deterministic Reserve:**
  - Focus is on risks that have high impact but low probability
  - Based on the outcomes under multiple economic scenarios, not just one
  - Uses a GPVAD (Greatest Present Value of Accumulated Deficiencies) method, not a Gross Premium Reserve
  - Discount rate, not the company’s projected portfolio rates, is prescribed

Stochastic Reserve Calculation

- Cash flows are projected under multiple economic scenarios from a prescribed stochastic generator that projects a range of future interest rate movements and equity returns.

- The process starts with an estimated value of the final reserve (i.e., starting assets) and then adjusts it for the amount of the greatest asset deficiency over the lifetime of the product.

- For each scenario, the **Scenario Reserve** is determined as follows:
  - Project the accumulated value of assets (may be positive or negative) at the end of each future projection year.
  - Accumulated deficiency = the negative of the accumulated assets.
  - Discount the accumulated deficiency at each future year to the valuation date.
  - Rank the discounted deficiencies in the prior step.
  - Scenario Reserve = the largest of discounted values, plus the starting asset amount.

- **Stochastic Reserve** = average of highest 30% of Scenario reserves (70 CTE).
### Challenges of Stochastic Modeling

- Stochastic component of the reserve calculation creates its own set of challenges
  - Need stochastic economic generator
  - Stochastic calculations require extensive computing time
  - Judgment is needed in building the model, including determining the number of scenarios
  - Stochastic calculation require robust, credible models, whose functionality and results are reviewed and validated

### Approval of Cash Flow Model

- Should states require pre-approval of the cash flow model?
  - Example: states provide company with a standard asset and liability portfolio that they would require a company to run and report on results.
  - Problem: standard asset and liability portfolio may not adequately test company-specific benefits and policy provisions.
- Model Validation
  - Rather than pre-approve of the model, states may decide to rely primarily on validating the model as part of their process of reviewing the reserve results (see next slide).
- Validation of assumptions
  - Under PBR, companies are required to submit experience data (mortality, lapse, etc).
  - Regulators can use that experience data to validate the policyholder experience assumptions used in the model.
Model Validation

- Static Validation
  - Checking key starting points of the model against inforce balances
  - Account values, policy counts, statutory reserves, etc.

- Dynamic Validation
  - Does trend of projected values line up with historical trends? Are projected values reasonable?
  - Premiums, claims, investment income, etc.

- Back-testing
  - Model past events to see how accurately model tracks actual outcome. Based on perfect hindsight, how do the projected results compare to actual results?
  - Compare actual results to model projections by inputting valuation assumptions that equal actual experience

- Single cell validation
  - Run the model for various and representative individual policies, one at a time
  - Check modeled results against actual policy values, policy illustrations, etc.
  - Include outliners in sample set of policies

Independent Peer Review

Initially, the Valuation Manual required an independent external peer review to accompany the company’s filing (at company’s expense) to opine on the appropriateness of the resulting reserve. The peer review would answer:

- Are assumptions reasonable, compared to actual company experience?
- Are methodologies implemented by the company reasonable?
- Has the company followed the requirements of the reserve calculation?

While no longer mandated, individual states could still decide to utilize an external peer reviewer

- States could include the validation of the cash flow testing model in the scope of the peer review.
CIPR Event

Save-the-Date

The Future of Automobile Insurance

December 2013
During the NAIC 2013 Fall National Meeting

For more information, please visit http://www.naic.org/cipr_events.htm.
Notes