Pandemics, Catastrophic Trends and Capital Issues

John P. Cookson, F.S.A.
Milliman, Inc.
Tail Risk

- Pandemic is the prime example
- Other risks could combine to reach this level
- Pandemic combines with other risks and can occur at same time as other unfavorable risks
Measurement of Healthcare Risk

- Typically related to increases in Loss Ratio (LR) above target
- Always expect some random fluctuation
- LR a function of premiums and claims
- Both driven by claim cost trend
  - Claim trends determine future claims when applied to past claims
  - Past claim trends, inaccurate forecasts of past claim trends and forecast of future claim trends determine premium
- So claim trend is a primary driver of LR fluctuations
- Claim cost trend is primary driver of healthcare underwriting risk
Types of Risk in Healthcare Insurance

- Management Risk
  - Bad decisions

- Other (non-controllable)
  - Political—Obamacare, mandated benefits, rate regulation, exchange risk corridors, rebates, risk adjustment

- Random Risks
  - Catastrophic claims, epidemic, catastrophes

- Economic Risks
  - Unanticipated changes in the economy affecting trends
  - Economic growth, inflation

- All can affect perceived trends
Risk Affects Capital Needs

- Capital needed reflects the risks taken
- Size and geographic spread affects risk
- Access to capital affects risk
- Reinsurance or other risk transfers can control risk
- Does reinsurance or risk control necessarily reduce the capital you need since if it reduces risk?
  - Counterparty Risk
  - Regulator RBC Credit?
  - Rating Agency RBC Credit?
Impact of Trends on Rating Lag

Time Line for Experience and Rating Period

Per Capita Claim Cost

Year X  Year X+1  Year X+2

EP May

7 Month Lag between End of EP and Beginning of RP

19 Month Lag between End of EP and End of RP

Time Lag Between Experience Period (EP) and Rating Period (RP)
Historical Trend Fluctuations

Adjusted HCl and S&P Claims Indices vs. CPI-W (1-Year Trend, 12-Month Lag) + Personal Income (3-Year Trend, 18-Month Lag)
Impact of Trends on Underwriting Cycle

Blue Cross/Blue Shield Underwriting Gain/Loss vs. Change in Healthcare Trends

-8% -6% -4% -2% 0% 2% 4% 6% 8% 10% 12%


Blue Cross / Blue Shield Underwriting
Change in Health Cost Index
Modelling for Pandemic Risk

- Pandemic Risk Development
  - *Potential Impact of Pandemic Influenza On the U.S. Health Insurance Industry* report, Jim Toole with input from panel of actuaries
  - Estimates cost impact of 1957 and 1918 level pandemics
  - Potential cost impact
- Two point estimate not enough
- Need chance of occurrence
  - Rely on Life cat bond work
- Trend history has epidemics since early 1970s and 1960 for NHE
Develop Loss Ratio Model

- First build model of other risks
- Driven by claim trend fluctuations plus other factors
- Then add in pandemic risks on top of other risks as simulation
- Flow trends thru rating system model
  - Historic trends flow thru to rates along with forecasts
  - Future trends simulate claims
- Rating model should be for homogenous classes rated on same basis
  - Prospective, contingent premium, refunds, etc.
  - Don’t mix Medicare Advantage with Commercial
  - Homogeneous risk characteristics
Develop Loss Ratio Model--Premiums

- Bring in other premium variables
  - Lag between experience and renewal data
  - How rates are developed
  - Impact of past trend estimates
  - Predictability of trends and methods
  - Target LR
  - Healthcare Reform impacts
  - Expenses and margins, lapses and sales
  - Pandemic rating effects
Develop Loss Ratio Model--Claims

- Model of historic trend fluctuations
- Impact on different carriers
- Size of block effects
- Starting cost estimate fluctuations
- Healthcare reform effects
- Correlations of trends
- Pandemic model impacts
Develop Loss Ratio--Composite

- Divide simulated claims by simulated premiums
- Distribution of Loss Ratios
- Develop probabilities of attachment at various LRs
- Develop expected costs at various LRs
In Event of Severe Pandemic with no Protection

- What happens to RBC
- How do you recover?
- Impact of ACA Loss Ratio rebate requirements
Cat Bond Development

- Use Loss Ratio Model as base for bonds
- Bond proceeds at risk of loss if attachment LR exceeded
  - Proceeds held in trust
- Risk premium over short-term investment rates
  - Represents payment for risk
  - Bond Rating Valuations
- Provides capital relief for proceeds held in trust
- Long-term must continue reissuing or
  - Raise other capital to replace
- Rating agencies limit on how much credit provided in their ratings
Alternative Methods

- Use forecast of trend methods with simulations
  - Good forecasts can reduce variability and costs

- Use swaps or reinsurance on trends
  - Can limit to pandemic with two triggers
    - High trends plus flu pandemic

- S&P Healthcare Claims Indices
  - Futures and Options?
  - Swaps
  - Traditional Reinsurance
  - Issue of capital credit for risk

- Some need tighter protection than just pandemic (ACOs)
  - Better modelling, trend prediction, etc. can tighten the ranges
Control of Trend Risk

- Until recently no clear database
- S&P Claims Based Indices introduced in October 2013
  - History back to early 2008
- Insurers and ACOs beginning to explore links to S&P
  - How do you increase future payment levels?
  - How do you measure performance?
  - How do you share risk?
- ASO groups looking for trend protection in future costs as a way to measure and guarantee performance
S&P Trend Detail

- National, Regional, most States, some Metro areas
- Several medical service breakdowns
  - IP, OP, Practitioner, Rx
- Individual, Small Group, Large Group, ASO
S&P Total Cost Trends

Total Cost - 12 Month Trends

- National ASO Total Cost
- National Individual Total Cost
- National Large Group Total Cost
- National Small Group Total Cost
Impact of Individual on Total Healthcare Costs

Total - 3 Month Trends

- Total
- Total Excluding Individual
- Differential
S&P All Business Trends

All Business - 12 Month Trends

- National All Business Facility Cost
- National All Business Professional Services Cost
- National All Business Rx Cost
- National All Business Total Cost
S&P Healthcare Claims Indices

- Standard & Poor’s and S&P are registered trademarks of Standard & Poor’s Financial Services LLC, a part of McGraw Hill Financial. Dow Jones is a registered trademark of Dow Jones Trademark Holdings LLC (“Dow Jones”).
Disclaimer

- This presentation is a general outline of certain issues related to Health Insurance Risk. This is not to be relied upon for any applications by any user, since the particular circumstances may differ from the general discussion here. Actuarial estimates are based upon sets of assumptions and to the extent the future results differ from these assumptions, the estimates will differ from actual results. Furthermore, there is significant variability in health insurance which makes results subject to considerable uncertainty.