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
- RP December

- 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 HCI 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
Impact of Individual on Total Healthcare Costs

Total - 3 Month Trends

-2.0% 0.0% 2.0% 4.0% 6.0% 8.0% 10.0% 12.0%

May-09 Jul-09 Sep-09 Nov-09 Jan-10 Mar-10 May-10 Jul-10 Sep-10 Nov-10 Jan-11 Mar-11 May-11 Jul-11 Sep-11 Nov-11 Jan-12 Mar-12 May-12 Jul-12 Sep-12 Nov-12 Jan-13 Mar-13 May-13 Jul-13 Sep-13 Nov-13 Jan-14 Mar-14 May-14 Jul-14 Sep-14

Total
Total Excluding Individual
Differential