

Pandemics, Catastrophic Trends and Capital Issues

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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

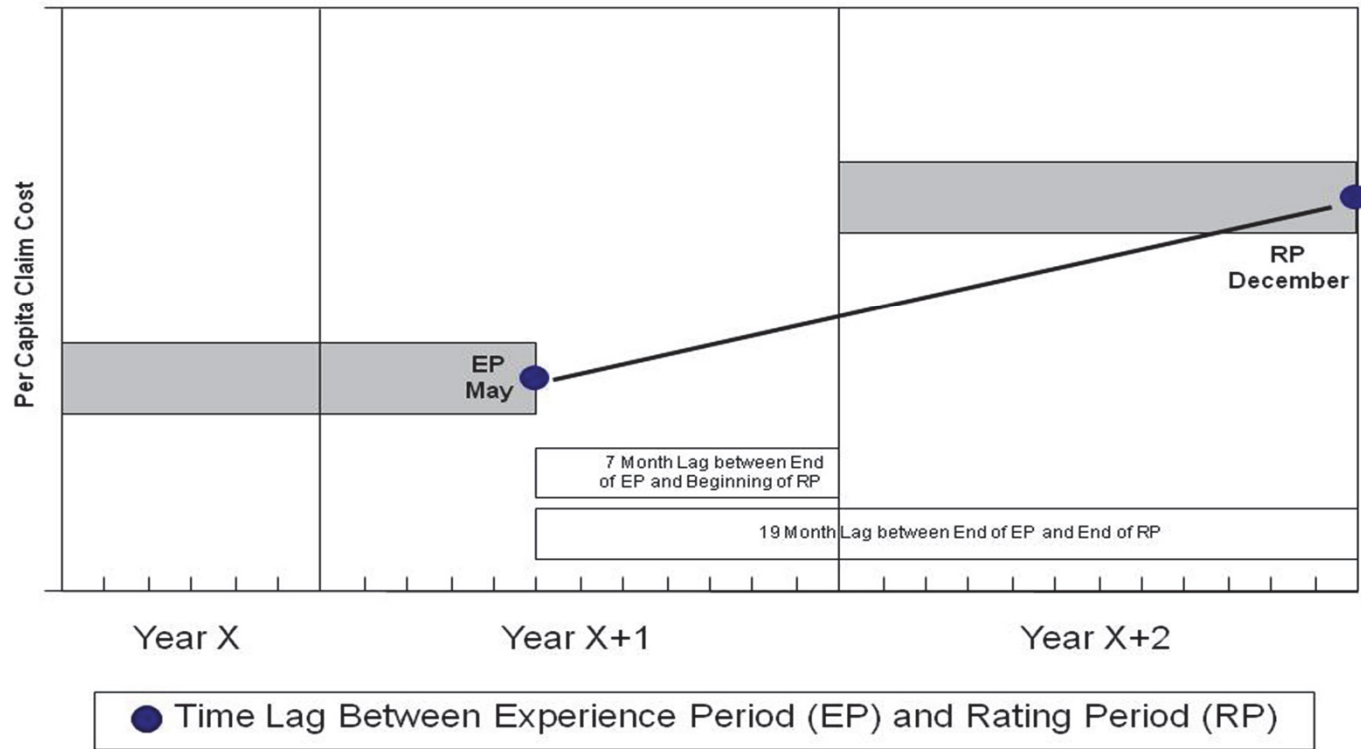
- Management Risk
 - Bad decisions
- Other (non-controllable)
 - Political--Obamacare, mandated benefits, rate regulation, exchange risk corridors, rebates, risk adjustment
- Random Risks
 - Catastrophic claims, epidemic, catastrophes
- Economic Risks
 - Unanticipated changes in the economy affecting 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?

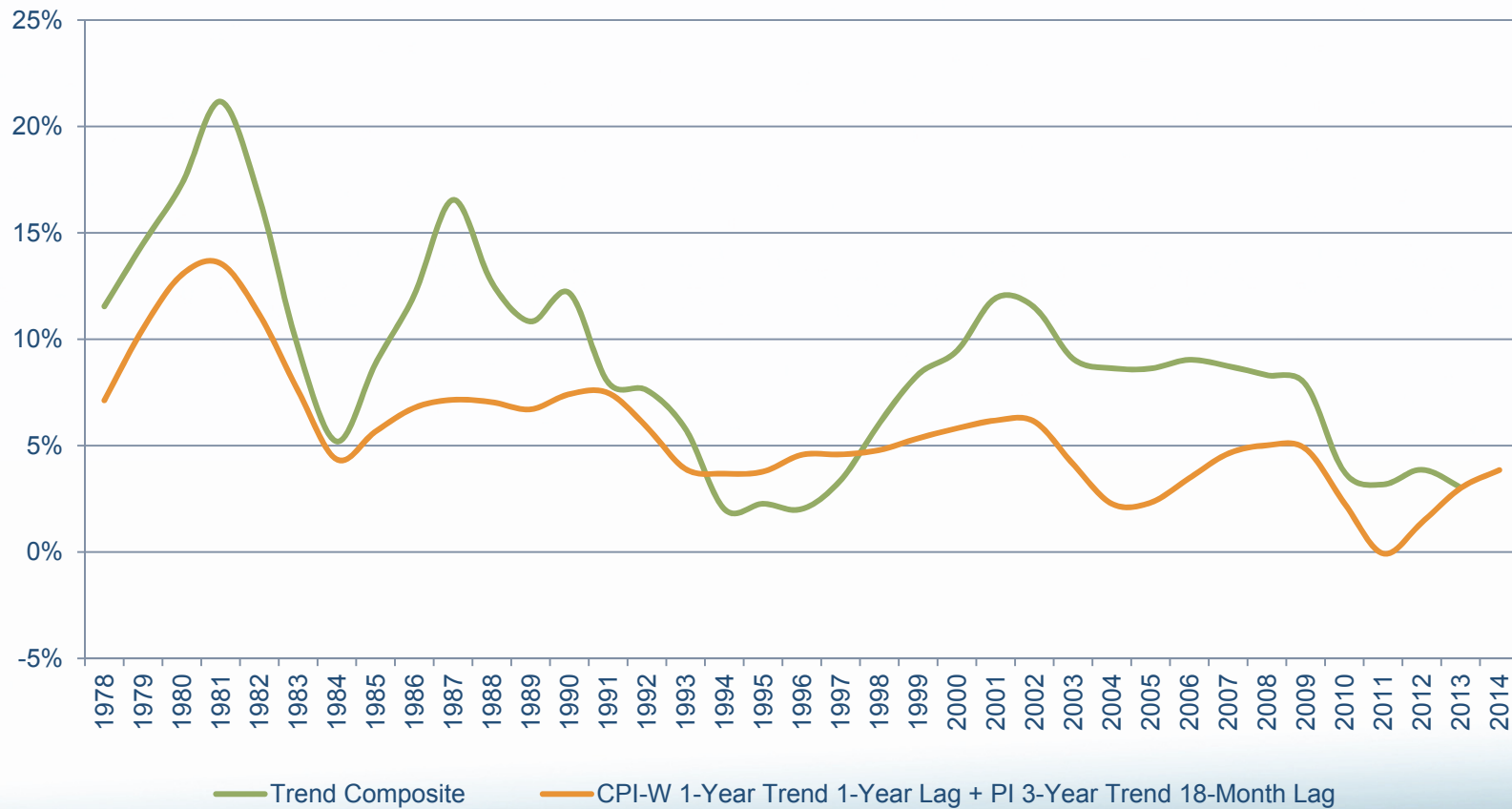
Impact of Trends on Rating Lag

Time Line for Experience and Rating Period



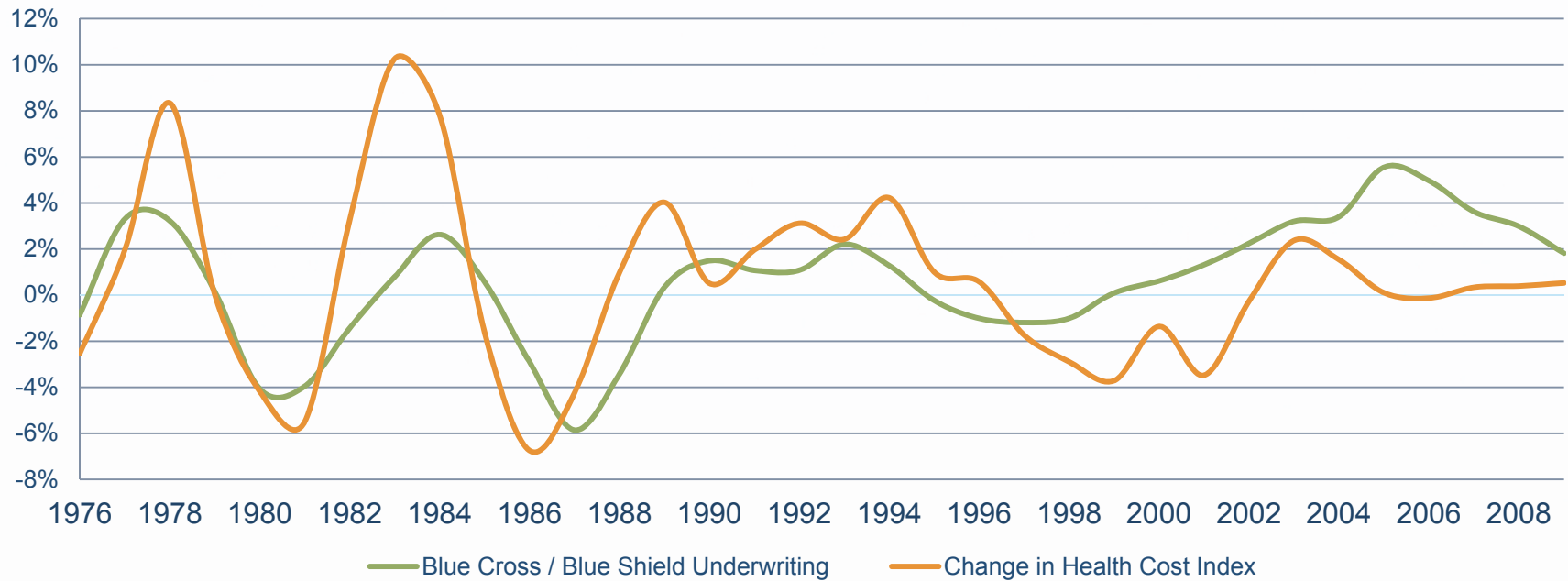
Historical Trend Fluctuations

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



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

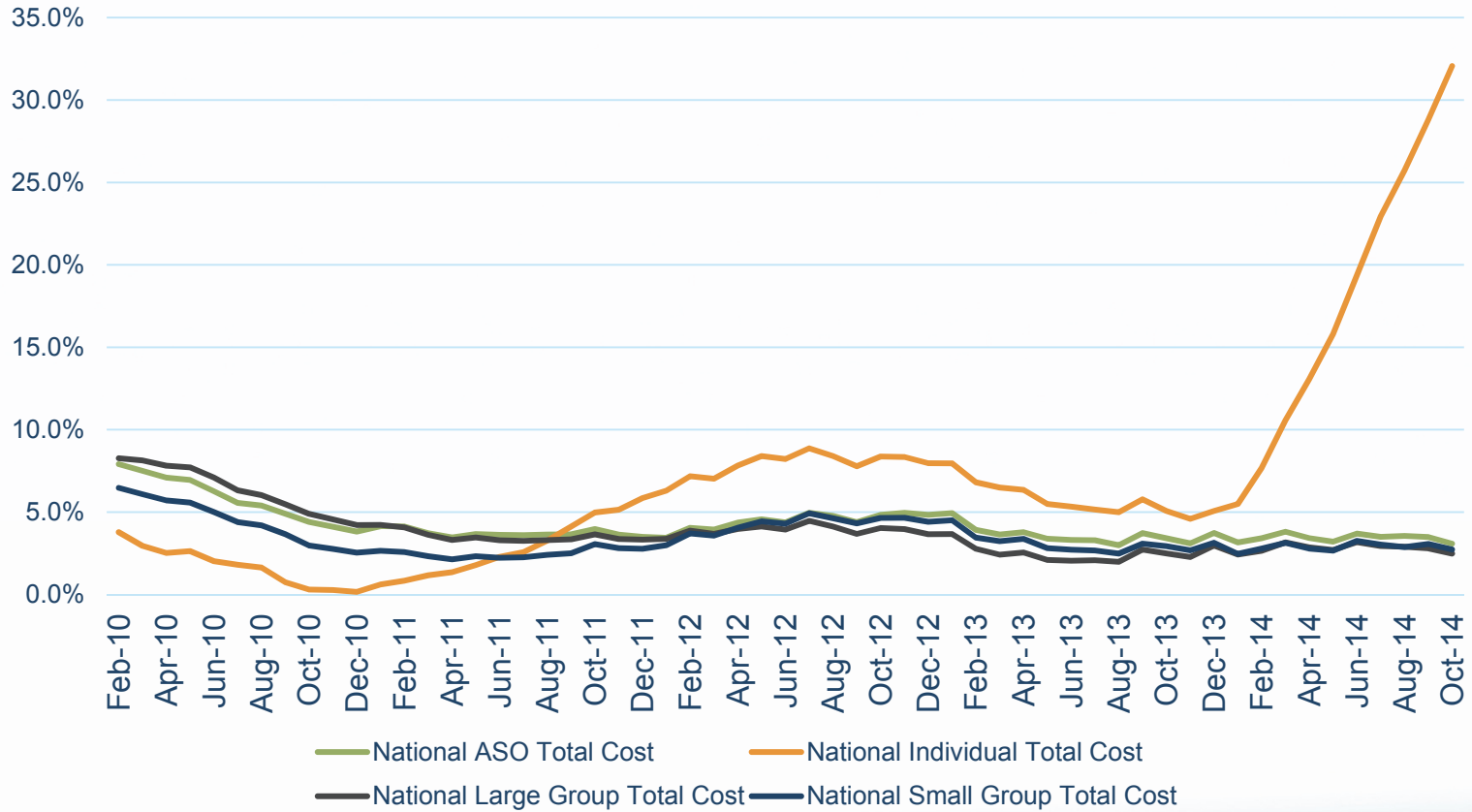
- Until recently no clear database
- S&P Claims Based Indices introduced in October 2013
 - History back to early 2008
- Insurers and ACOs beginning to explore links to S&P
 - How do you increase future payment levels?
 - How do you measure performance?
 - How do you share risk?
- ASO groups looking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

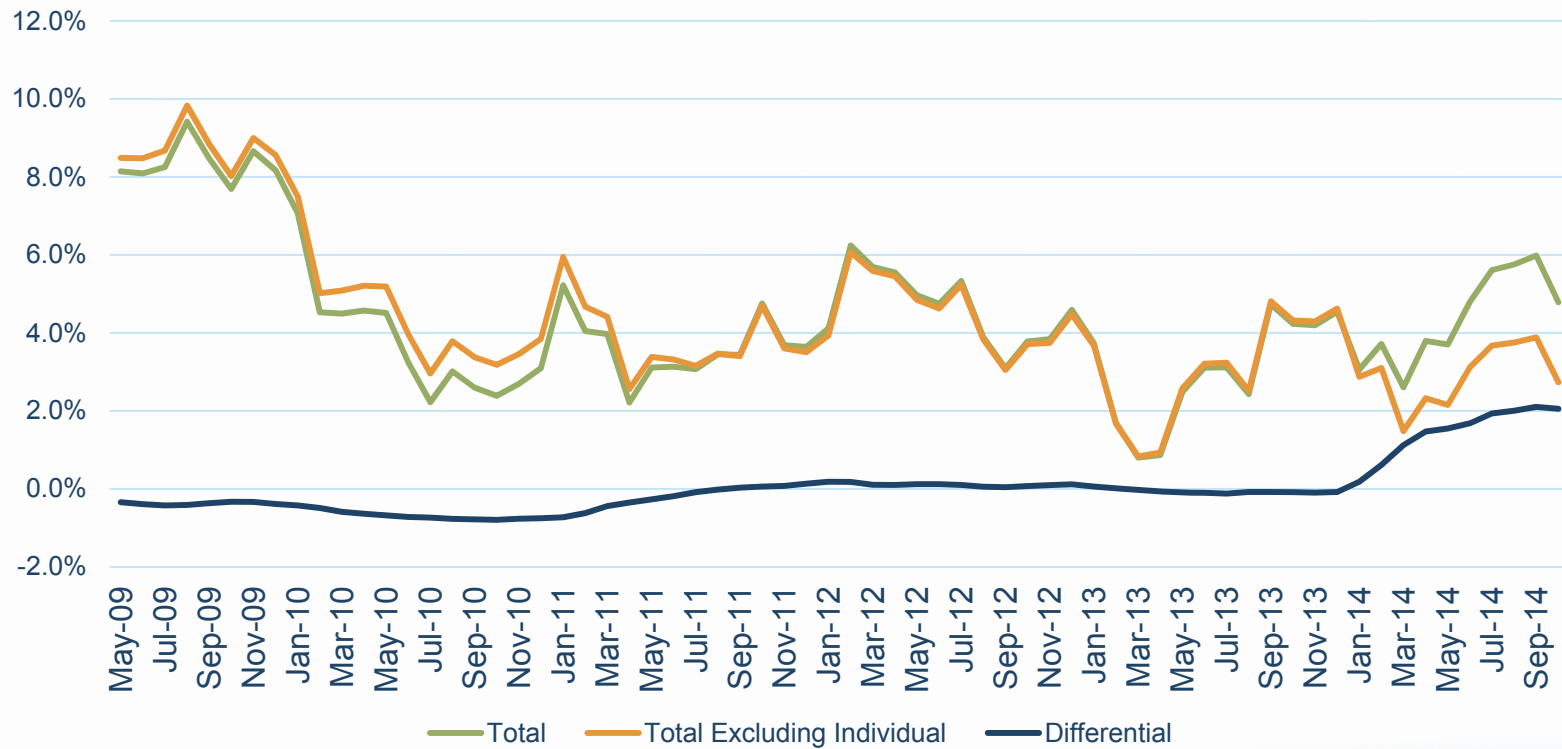
S&P Total Cost Trends

Total Cost - 12 Month Trends



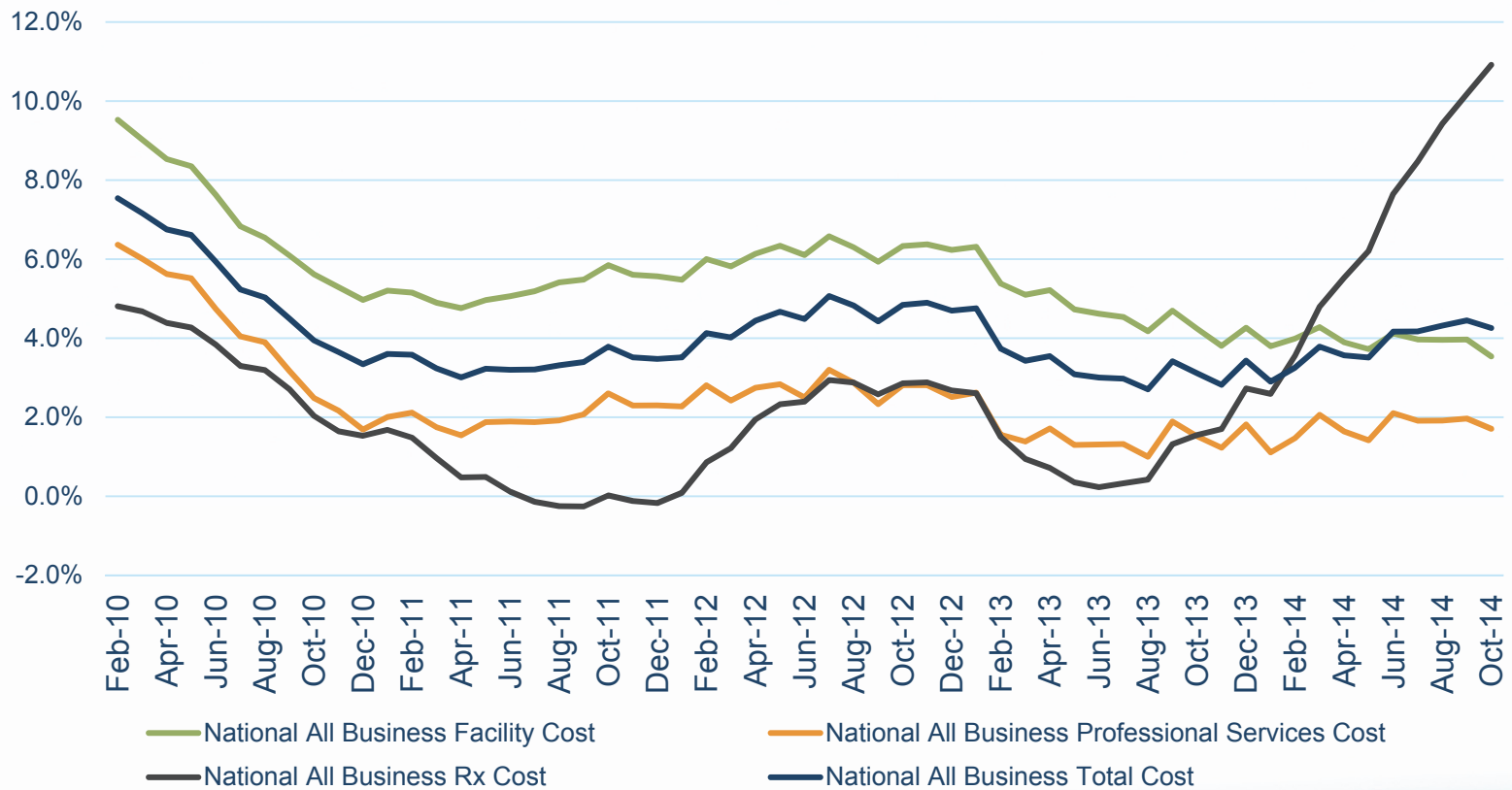
Impact of Individual on Total Healthcare Costs

Total - 3 Month Trends



S&P All Business Trends

All Business - 12 Month Trends



S&P Healthcare Claims Indices

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