

# **(Re)insurance Asset-Liability Management and ERM**

**Jim Maher, MA, FCAS, MAAA, CFA  
Chief Risk Officer  
Platinum Underwriters Reinsurance Inc.**

# ALM

- ALM= Asset Liability Management
- Previously known as Asset Liability Matching
  - Is matching always the right approach?
  - Sometimes you can't match even if you want to

# ERM

- ERM= Enterprise Risk Management
- Includes all risks facing the (re)insurer
  - Assets, Liabilities
  - Capital, Funding risks
  - Operational Risks, etc.

## ALM / ERM questions

- What do the financial statements of a P&C (re)insurance company look like?
- What is the best way to invest the assets?- i.e asset/liability management
- What are some issues that can arise /risks that can “show up”?

# P&C Balance Sheet

- Consider following example of a p&c (re)insurer:
- **Capital & Surplus: \$1 Billion**
- Expected Annual Written Premium: \$500 Million
- **Insurance Liabilities (aka reserves):**
  - \$700 Million with duration ~ 4 years
- **Investable Assets: \$1.7 BN**

# Liabilities

- Liabilities are “risky”
  - i.e. timing and amount are both uncertain
  - In particular “casualty” is inflation-sensitive
    - Economic inflation (medical)
    - Non-economic inflation (“social inflation”)
  - “property” has catastrophe risk
    - Random but can have time clustering
    - For example 4 hurricanes in FL in 2004

# Premium

- Often (re)insurers are cash-flow positive
  - Have premium coming-in to invest
  - Concept of “float”- i.e. The time lag one has to invest funds before claims are paid out
  - So more latitude to “correct the ship” than say a “closed” defined-benefit pension plan.

# Investment strategy

- How to invest the assets?
  - Cash, Bonds, Equities, Alternatives?
- Assets backing reserves?
  - Match timing & amount?
  - High quality fixed income
- Assets backing surplus?
  - Hedging potential ALM risks?
  - Real (after inflation) growth?



# Assets backing reserves

- Ideal liability-matching asset does not exist
  - TIPs can hedge CPI
  - But no fixed income assets available to hedge even medical CPI
  - Casualty reserves subject to social inflation as well
  - Also timing is uncertain

# What is Social inflation?

- Recent Actuarial presentation:
- <http://www.casact.org/community/affiliates/cagny/0611/Patel.pdf>
- Social inflation: “Increase in frequency and amount of jury awards due to a change in the legal environment
- Concept generally means excess inflation in a property/casualty environment compared to CPI

## What is Social inflation? Ctd.

- Another example (property):
- Homeowners insurance
  - Generally replacement cost coverage
  - Excess trend in homeowners claims due to:
    - Custom kitchens
    - New roofing materials/trends
    - Electronics and other contents

# Assets backing reserves, ctd.

- Typical strategy
  - Invest in high grade fixed income with similar duration/maturity to reserves
  - Don't want to take a lot of risk with policyholders/claimants money
  - Mix of
    - Corporate Bonds
    - Municipal Bonds
    - Mortgage Backed Securities
    - Treasuries
    - TIPS

# Corporate Bonds: (David Swensen)

- “IBM illustrates the problem confronting purchasers of corporate debt. The company issued no long-term debt until the late 1970s, as prior to that time IBM consistently generated excess cash. Anticipating a need for external finance, the company came to market in the fall of 1979 with a \$1 billion issue, at the time the largest-ever corporate borrowing. IBM obtained a triple-A rating and extremely aggressive pricing on the issue, which resulted in an inconsequential yield spread over U.S. Treasuries and (from an investor's perspective) underpriced call and sinking fund options. Bond investors spoke of the “scarcity value” of IBM paper, allowing the company to borrow below U.S. Treasury rates on an option-adjusted basis. From a credit perspective, IBM debt had nowhere to go but down. Fourteen years later, IBM's senior paper carried a rating of single A, failing to justify both the rating agencies' initial assessment of IBM's credit and the investors' early enthusiasm for IBM's bonds. Bond investors had no opportunity to lend to the fast-growing, cash-generative IBM of the 1960s and 1970s. Instead, bond investors faced the option of providing funds to the 1980s and 1990s IBM that needed enormous sums of cash. As IBM's business matured and external financing requirements increased, the quality of the company's credit standing eroded.”
- From Unconventional Success

# Corporate Bonds- other issues

- Low liquidity on secondary market
  - Increasingly so post financial crisis
  - Banks have stepped away from market making
- Mis-alignment with co. management
  - Management more focused on equity holders

# Municipal Bonds

- Tax-exempt securities
  - valuable to P&C (re)insurer
- Even lower liquidity than corporate bonds
  - Large group of retail investors who don't trade
  - Don't want to sell bonds at a gain
    - Would convert tax-free income into taxable capital gain
  - Tough to find buyers when bonds trade at a discount
    - OID issue, only interest is tax-exempt
    - Gain from buying at a discount is taxable

# Municipal Bonds

- Bankruptcy issues
  - Detroit bankruptcy
  - Unpredictable things can happen in court
  - Court trying to balance investor interests against pensioners, citizens
  - Follow Kristi Culpepper on twitter @munilass- very eye-opening.
- Tax risk
  - What if IRS disallows tax-exempt status of the bonds



# Mortgage Backed Securities

- Non-agency MBS- lots of issues in credit crisis
  - Read Michael Lewis’s book “The Big Short”
- Agency MBS
  - No credit risk but lots of “timing risk”
    - Pre-payment and extension risk
    - Timing of insurance liabilities is already uncertain
    - Do I want to make things even “more” uncertain by adding more timing uncertainty

# Treasuries

- Pros
  - Extremely Liquid
  - Useful for quickly adjusting duration
  - May gain in value in a crisis
    - Flight to quality
    - Hedge against deflation
- Cons
  - Very low yielding
  - 3 year treasury @ 1%
  - Inflation @ approx 2%
  - Losing 1% per year in real value

# TIPS

- Pros
  - Hedge against inflation (CPI)
  - Breakeven inflation relatively low
    - 10 year BEI @ 2.14%
- Cons
  - As above, don't just care about CPI
    - “social inflation” etc.
  - Real yields very low
    - 5 year real yield @ -0.16%
    - 10 year real yield @ +0.33%

# Assets backing Surplus

- More freedom to invest
- Mix of equities, bonds
  - Alternatives such as real estate?
- Hedge against mismatches that may develop between liabilities and assets backing liabilities
  - For example unexpected inflation
- Achieve a positive real rate of return
  - Preserve economic position of firm

# Enterprise Risk Management: Potential Issues

- Key word is “Enterprise”
  - i.e. look at the whole company, both sides of the balance sheet
- Two potential key issues:
  - Consistency between different sides of the balance sheet
    - i.e. liabilities vs. assets
  - Possible interactions between risks on the liability side & asset side

# Consistency of risk/reward

- Corporate Bonds
  - Spread: OAS = Option Adjusted Spread
  - Microsoft (AA+) 5 year bonds: OAS = 20 bps
- Cat Risk
  - ROL= ?

# Consistency in assessing tail risk

- Cat risk
  - 100+ years of historical data
  - Assess 100 yr/250 yr PMLs
- Asset risk
  - Some asset risk models
  - Looks at 3-5 years of data (recency bias)
  - Exponentially weighted (more recency bias)
  - Assumes normal distributions with mean/covariance framework
  - 2008 crisis is already a distant memory,

# Potential for Interactions

- How might asset side & liability side interact?
  - i.e. both get hit at the same time, double-whammy
- What external factors could negatively impact both?
  - Is correlation approach the best?
  - Event/scenario driven approach?



# Asset/liability sides of the B/S

- Life Insurers in 2007-2009 Credit crisis
  - Some got hit on both sides of B/S
    - A few took TARP Money
  - Assets: structured/”risky” bonds
    - Embedded equity market risk
    - CDOs etc.
  - Liabilities: Variable annuities and similar products
    - Embedded equity market risk
    - Effectively sold equity put options to policyholders
    - Risk not fully hedged

# Example: Stock Price History



# Could P/C (re)insurers be hit with a double-whammy?

- What are some potential candidates?
- Cat risk and Muni bonds?
- Inflation?
  - Inflation sensitive liabilities
  - Nominal bonds
- Surety insurance and corporate bonds
  - Enron scenario

# Stagflation scenario= Triple Whammy?

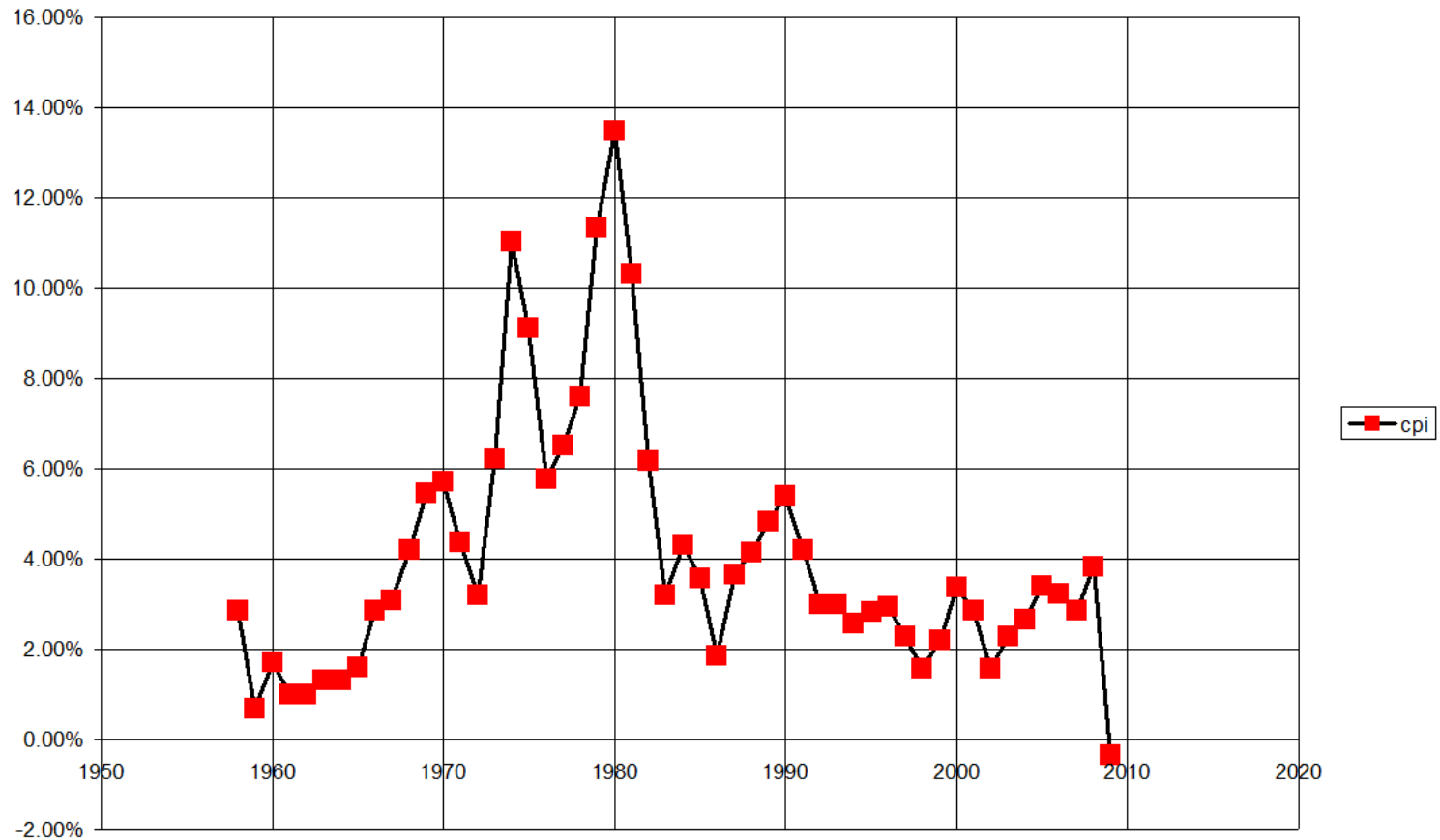
- Weak economy/recession
  - Premium / top-line takes a hit
  - Stocks take a hit
- Interest rates up
  - Bonds take a hit
  - Tips may or may not take a hit
    - Weren't around then
- Inflation up
  - Casualty liabilities spike up

# 1970s-early 1980s stagflation

- Double digit CPI
  - Peaked at 13.5% in 1980
- Interest rates up
  - 5 year treasury @ around 16% at peak
- GDP mixed
  - 1973-1974 recession was relatively shallow
  - 1981 recession was very severe
    - Impact of Volcker trying to crush high inflation

# Historical Stagflation: CPI

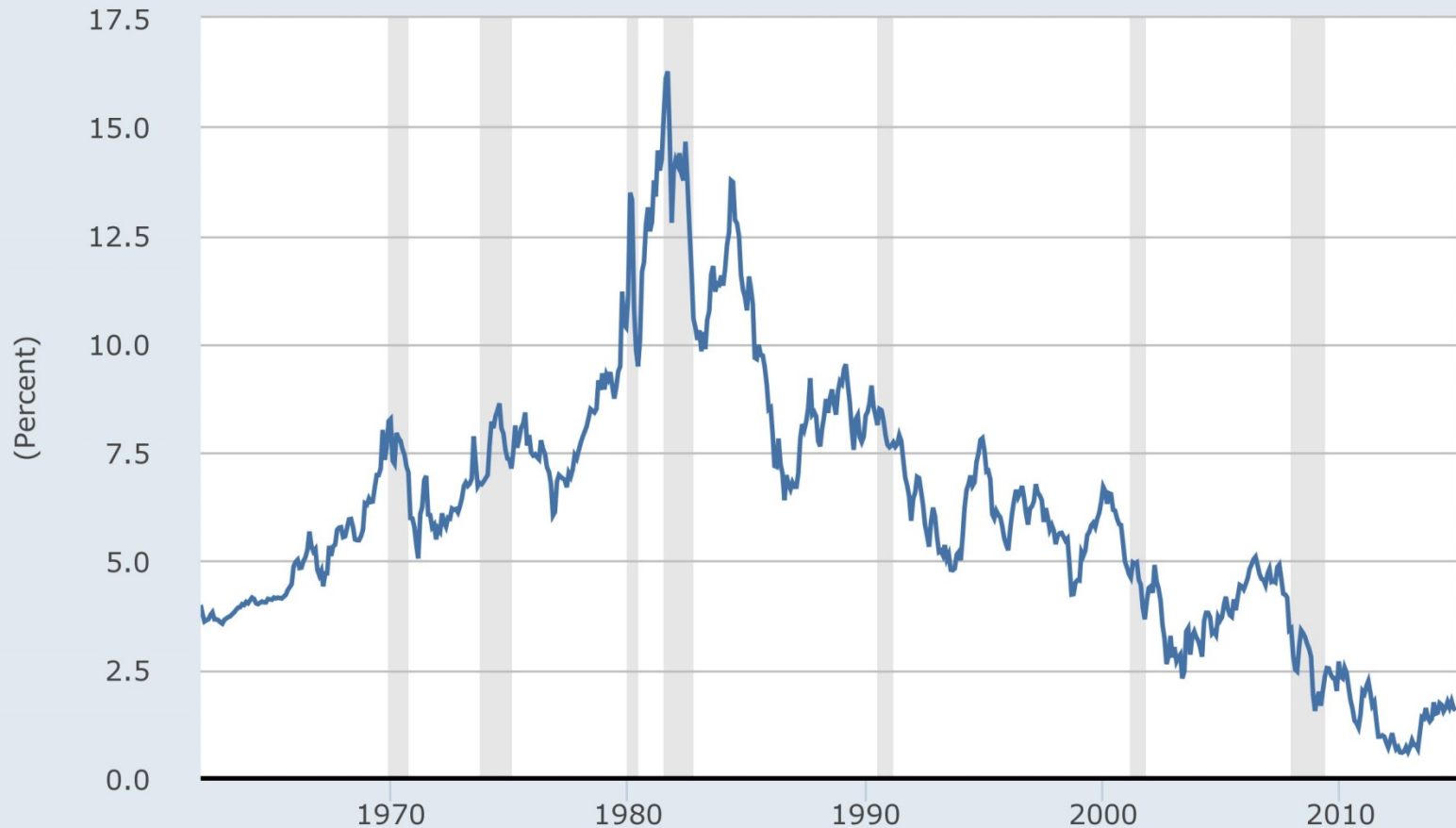
CPI



# Stagflation and Interest rates

**FRED** 

— 5-Year Treasury Constant Maturity Rate



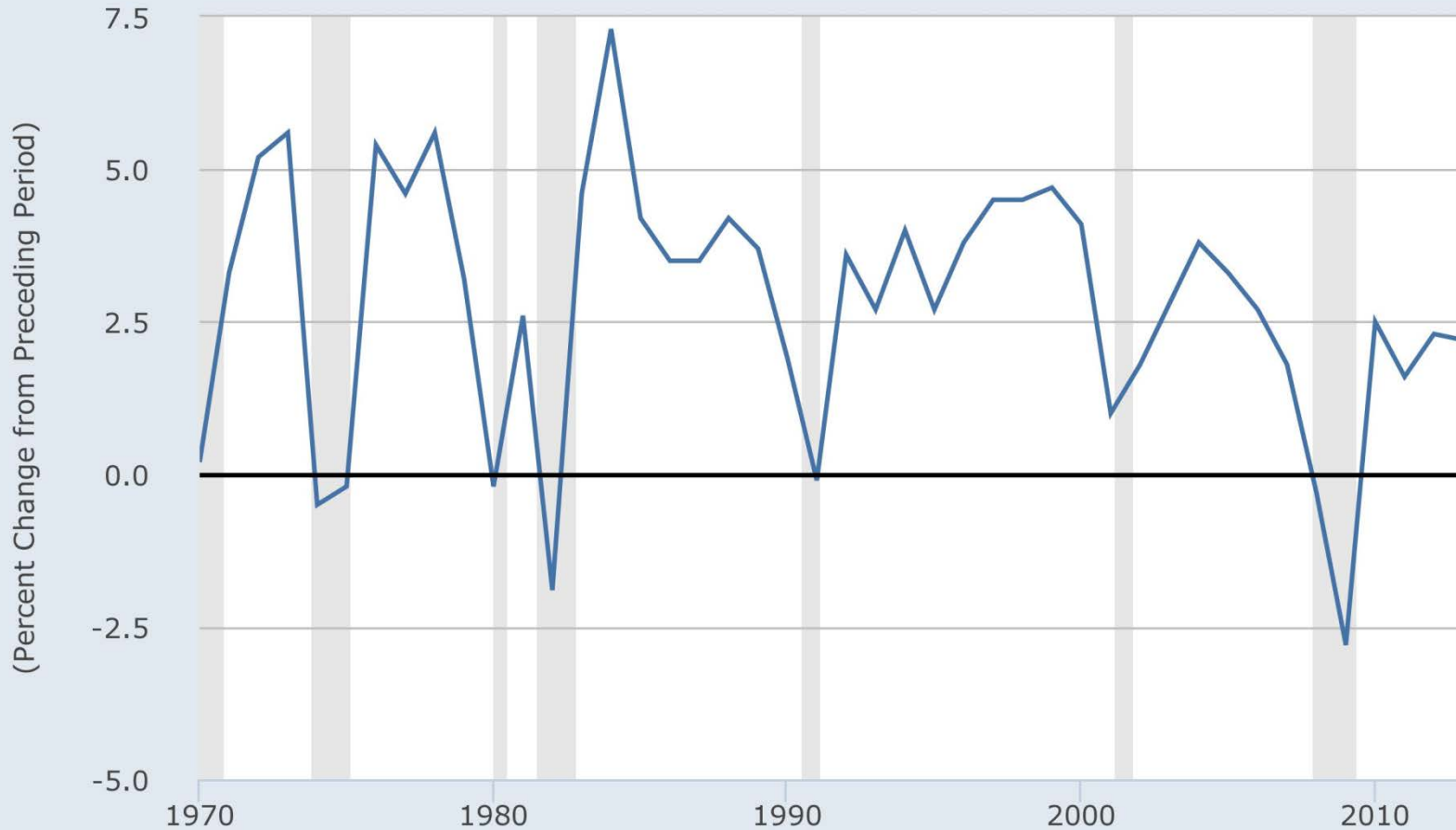
Source: Board of Governors of the Federal Reserve System (US)

Shaded areas indicate US recessions - 2014 [research.stlouisfed.org](http://research.stlouisfed.org)

# Historical Stagflation: GDP

FRED 

— Real Gross Domestic Product



Source: US. Bureau of Economic Analysis

Shaded areas indicate US recessions - 2014 research.stlouisfed.org



# Stagflation and p/c impairments

- Impairments spiked in 1975
- Also in 1985-1990
- Source: American Academy of Actuaries “Property/Casualty Insurance Company Insolvencies”, September 2010

# Stagflation and P/C Impairments

P&C Impairment percentage

