FEDERAL RESERVE BANK OF BOSTON CONFERENCE

"WHAT ARE THE CONSEQUENCES OF LONG SPELLS OF LOW INTEREST RATES?"

Applying Lessons Learned to Actively Hedge Rate Risk

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Who is MassMutual?

Our mutual structure is the foundation of our business strategy

Mutual life insurance company with a unique combination of assets that deliver sustained high returns for our policyowners

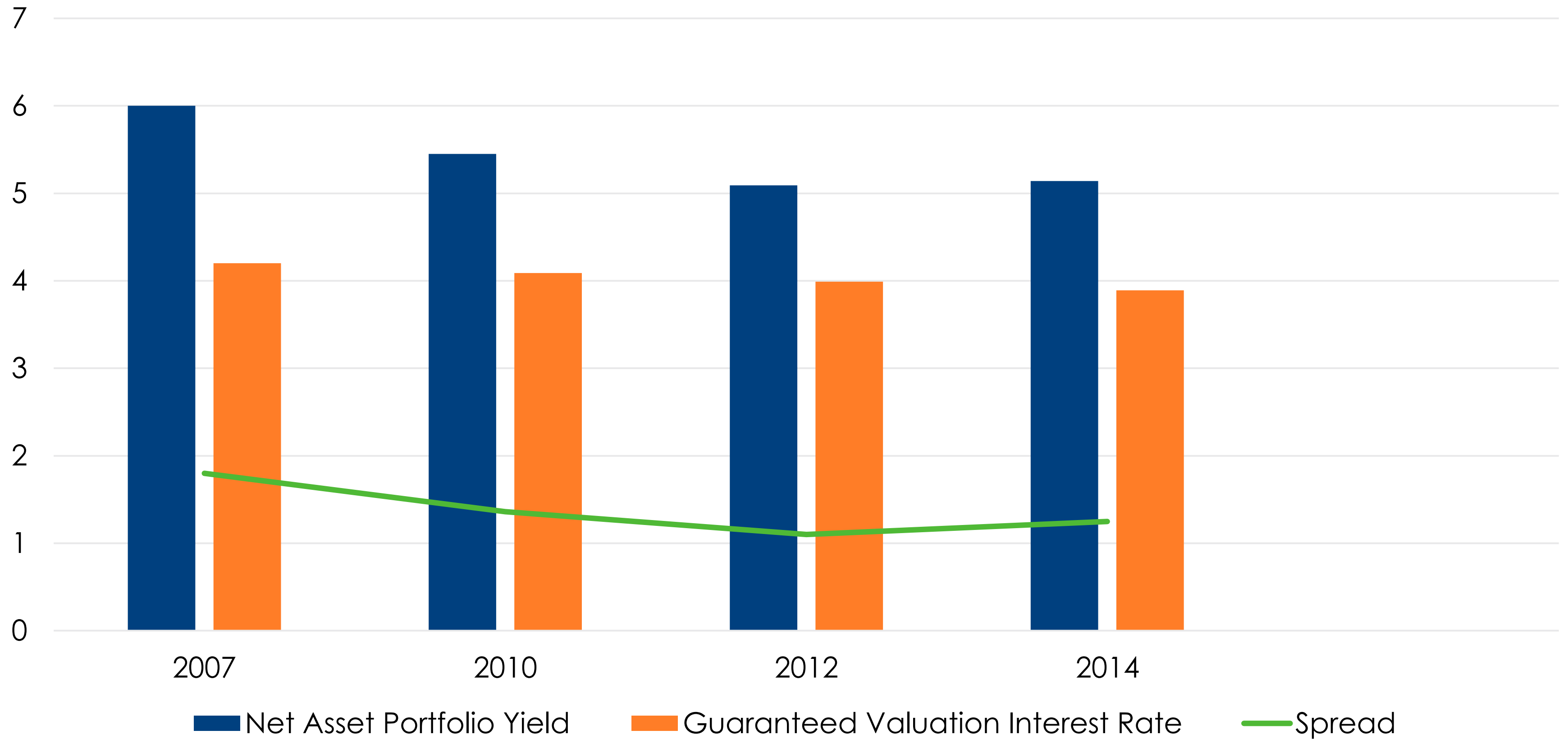
- Founded in 1851, MassMutual is a leading mutual life insurance company and Fortune 100 Company headquartered in Springfield, Massachusetts*
- With whole life insurance as its foundation, MassMutual provides products to help meet the financial needs of clients, such as life insurance, disability income insurance, long term care insurance, retirement/401k plan services and annuities
- Enhanced financial strength with record levels of statutory surplus and total adjusted capital, $18.3 billion and $15.0 billion, respectively**
  - Announced an estimated 2018 dividend payout of $1.6 billion to eligible participating policyowners – the 150th consecutive year the company will be paying a dividend
  - Delivered more than $5 billion in benefits in 2017
  - Supported a network of financial professionals that now exceeds 8,400

Fortune Magazine, June 1, 2018 © 2018 Time, Inc.
**As of June 30, 2018

U.S. Life Insurance: Lower Interest Margins as Source of Earnings

While lower interest rates have lowered portfolio yields, insurance companies have taken actions too

- NAIC study included 713 U.S. life insurance entities over 2007-2014, using NAIC annual statements

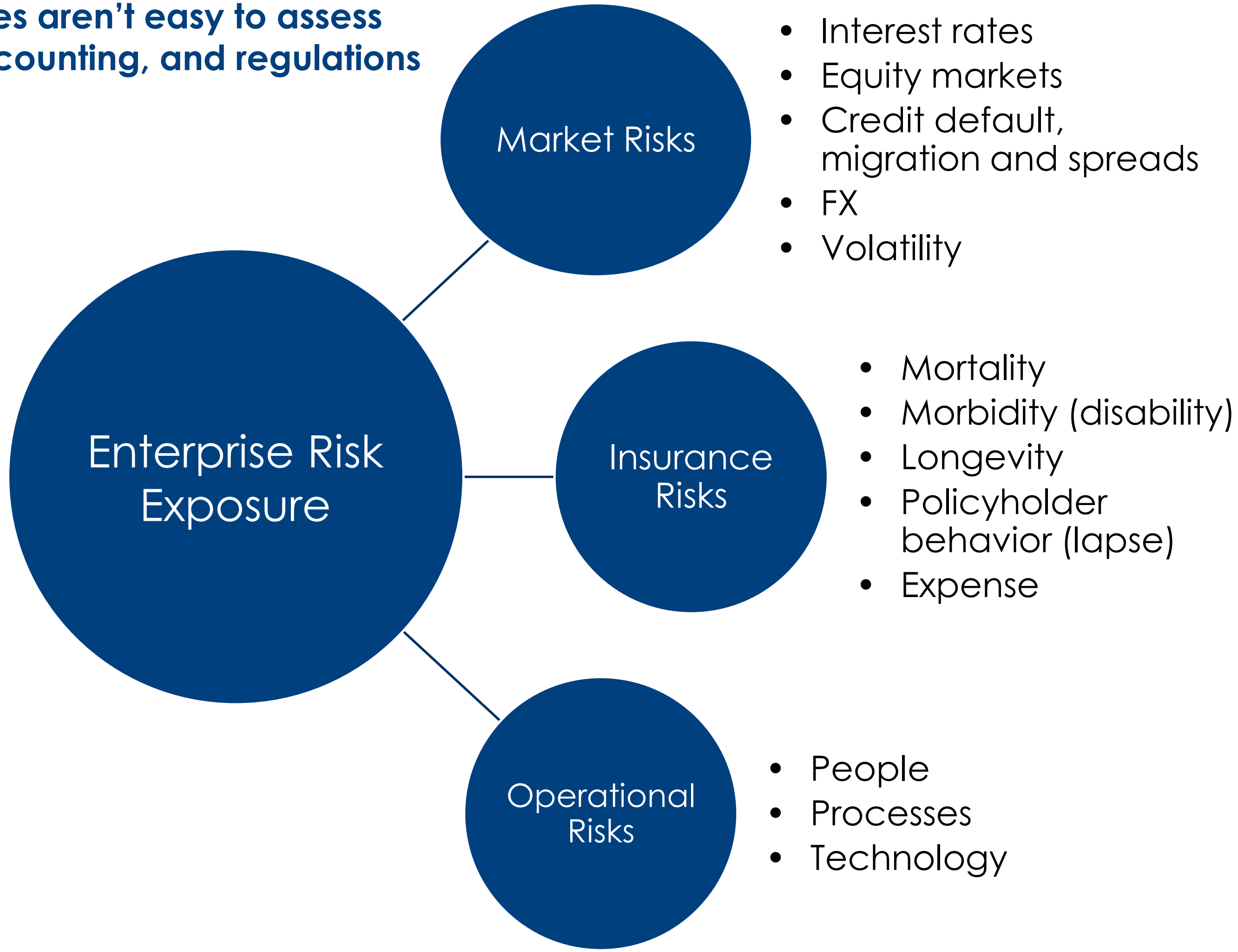


Source: *Monitoring Interest Rate Risk Low Interest Rate Study Update*, Larry Bruning FSA, MAAA Life Actuary NAIC to NAIC Financial Stability (EX) Task Force, April 3, 2016

Broader Focus on Operating Business Strength, Financial and Risk Management, and Strategy

Performance and management of life insurance companies aren't easy to assess without at least knowing the dynamics of the products, accounting, and regulations

- Strategy execution and financial management – a balance of growth, sustained profitability, and enterprise risk management
- While **many similarities** in needed governance, credit and some operational risks, **differences** from other financial sectors **include**
  - **Insurance risks** – given design and promises, time horizon is very different
  - Assets backing reserves and required capital are available to **meet policyholder promises in full**
- Capital risk management and liquidity management need to be appropriate for these differences and others



Managing Insurance Assets and Liabilities
Capital and liquidity through time

Glimpse at an insurance company’s application of focusing on interest rate exposure management

- Consider how **performance and risk** evaluated
  - Accounting: Which one - U.S. GAAP, IFRS, U.S. statutory (NAIC) or another?
  - Economic: Market-consistent economic value or internal modeling?
  - Rating agencies’ insurance financial strength ratings?
- Then the **levers and time horizons** for the analysis of the interest rate exposure can be developed
  - Top-down approaches to manage assets and liabilities include contingent capital and contingent liquidity sources as well as asset-liability management (ALM) and an enterprise risk appetite developed with various stress scenarios and performance perspectives
  - Capital and liquidity risk is assessed in near term as well as over a longer horizon (decades for capital and over a year for liquidity), given many long-tailed life insurance products and the product features
  - Focused risk management includes asset allocation, product portfolios, reinsurance, and the interrelationship of risk and returns
- Typically **many scenarios and differing models** are used to gain perspectives and validate them
  - Scenarios consider policyholder behavior, renewal and sales dynamics, as well as capital markets

Managing Insurance Assets and Liabilities Through Low Rates

What levers and options are available and what has the industry done generally?

- Many insurance companies have multiple models to have a U.S. GAAP, U.S. statutory as well as an economic lens
- Based on publicly available information as well as industry reviews from Wall Street banks and credit rating agencies, over the last several years, U.S. life insurers' portfolios have
  - only slightly more equity and below investment grade risk
  - diversified their portfolios into more alternative assets
- Since the financial crisis, products have increased premiums or non-guaranteed elements and/or redesigned products to incorporate the outlook of policy costs factors such as the cost of hedging or embed the hedging or risk management into the design of the product
  - Non-guaranteed elements include credited interest rates, expense charges, cost of insurance charges, index cap rates, variable premium rates and, in the case of mutual life insurers and participating products, policyholder dividends
  - Also, some companies have exited or partially exited some products with reinsurance or liability block sales

Supervising Macroprudential Risks in Insurance
Focusing on interest rate risk supervision of U.S. life insurance companies

What are relevant, primary tools available to U.S. supervisors?

- NAIC Financial Data Repository – quarterly analyses of the performance of the industry and annual interest rate study to identify concerns
- Risk-based Capital – includes interest rate risk component and detail on that component
- Annual Reserve Adequacy Analysis – also known as cash flow testing
  - Assesses current reserves as well as cash flow adequacy over several required scenarios. Many insurers perform more scenarios analyses
  - Standard Valuation Law requires life insurers to post additional reserves if the Appointed Actuary determines the assets supporting the reserves are insufficient to cover the outstanding liabilities
- Own Risk and Solvency Assessment (ORSA)

Supervising Macroprudential Risks in Insurance

Focusing on interest rate risk supervision of U.S. life insurance companies

What are additional tools being developed for supervisors?

- NAIC Financial Data Repository – statutory reporting regularly revised to collect more and detailed data
- Risk-based Capital – among other revisions, asset credit risk factors to be updated in near future
- Insurance reserve calculations continue to change with products and techniques
- Own Risk and Solvency Assessment (ORSA) - as part of NAIC Macroprudential Initiative (MPI), expand ORSA to improve insights into inter-affiliate agreements in an insolvency
- NAIC MPI – includes liquidity management assessment
- U.S. Federal focus – in addition to work with Team USA on group capital and a global Insurance Capital Standard (ICS), U.S. entity systemic risk identification and addressing those risks
- International Association of Insurance Supervisors – ICS as well as systemic risk identification, liquidity risk and macroeconomic exposures

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