



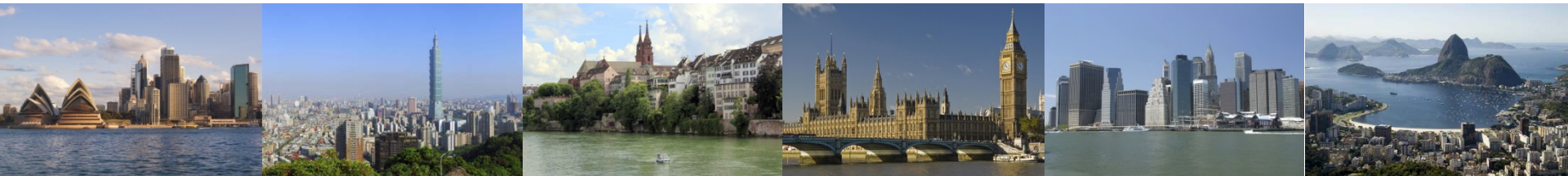
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Insurance functions in the financial system

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Disclaimer: The views expressed in the paper are those of the author and do not represent the views of the International Association of Insurance Supervisors and the Bank for International Settlements.



Evolution of Financial System

- Financial institutions and markets evolve over time and vary across countries
 - Modern insurers are different from insurers even 20 years ago, e.g. mass conversion from mutual to stock ownership around the world
 - The institutions called banks are different in the US and Germany
- Institutions and markets adopt to the changing environment (and regulation)
 - Reliance on internal capital models to determine regulatory capital requirements
 - Use of ratings in regulation, investment mandates, etc.
- Institutions role in the economy may change over time
 - Delegated asset management by life insurers
- Challenge for financial regulation: “The dog and the frisbee” – Less is more?
 - General equilibrium effects – Lucas critique
 - Targeted rules are easier to avoid – Goodhart law
- How to characterize the financial system in a way that is robust to the evolution of institutions and markets?

The changing face of the insurance industry

- Before the 2007-2008 financial crisis
 - "Boring business"
 - Strong industry resilience to high impact events
 - 3 major events in 2000s - 9/11 in the US, hurricane Katrina in the US, earthquake/tsunami in Japan - had little effect on the insurance industry
 - Failures are rare and concentrated among small/young companies
- After the crisis
 - Collapse of AIG, TARP support, etc
 - More interest among policymakers and academics
 - Shift from microprudential to macroprudential topics in the policy debate
- Was there a structural break?

Functions of the financial system

Function 1: to provide mechanism for managing risk

banks, insurers, mutual funds, asset managers, securities markets

Function 2: to pool resources and subdivide share in various enterprises

banks, insurers, mutual funds, asset securitization

Function 3: to transfer resources through time, across borders and among industries

equity and debt markets, banks, insurers, pension funds, sovereign wealth funds

Function 5: to provide payment system to facilitate trade

depository financial intermediaries, money market mutual funds

Function 6: to provide price information to help coordinate decentralized decision making

Capital markets: interest rates, security prices

Basics of the insurance core business

- Insurance contract is a contingent claim
 - Policyholder pays a premium P in exchange for the promise to get coverage for loss L , if it occurs
- What determines the premium P ?
 - Three factors: probability of loss, time value of money, insolvency risk
- Example
 - \$100K loss with $\text{Proba}=0.1\%$, risk free interest rate is 3%, one year contract
 - Expected cost of a claim is $\$100(=0.001*100K)$
 - If $P=100/(1+0.03)=\$99$, then in the end of the year insurer breaks even on average
 - BUT: its insolvency risk is 50%!
 - To reduce the insolvency risk to 1%, insurer has to charge $P=\$169$
 - Insurer is likely to accumulate surplus in the end of the year, on average \$74

Functions of the insurance core business

- Risk management
 - The benefits of diversification for imperfectly correlated risks
- Pooling of resources
 - Collecting premiums from many policyholders reduces the number of insurance contracts, per policyholder costs of investment in information, etc
- Transfer of resources
 - Collected premiums are invested in matching duration assets; medium to long term investment horizon
- Information production
 - Probability distribution of losses, adverse selection and moral hazard problems of policyholders

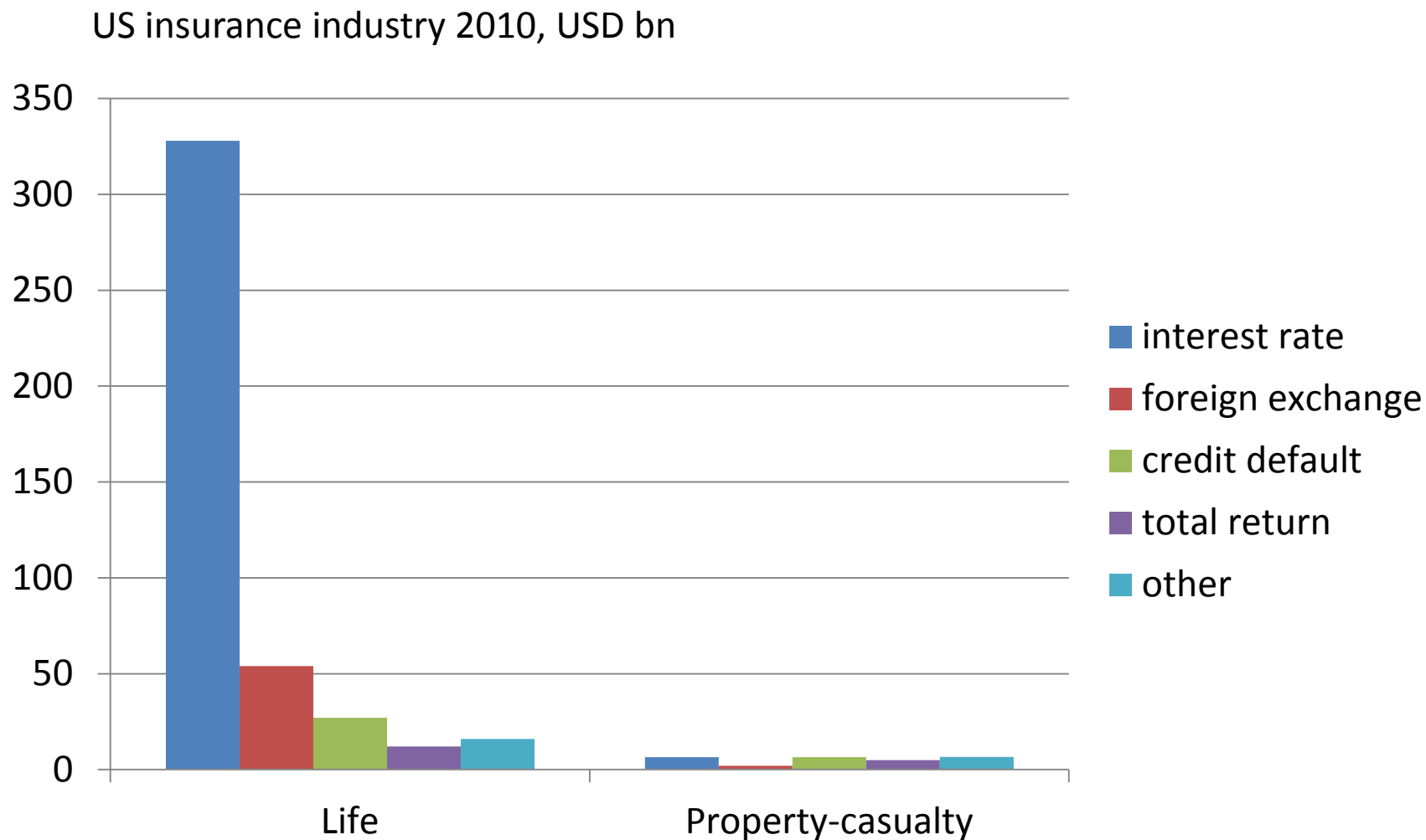
Financial innovation and insurance core functions

- Derivatives
 - To reduce the exposure of insurers to market risks that they do not control
- Securitization of underwriting risks
 - To transfer tail risk to the broader financial market and to increase the capacity of the insurance industry
- Asset management in life insurance
 - To provide delegated asset management services, life-cycle consumption smoothing
- Financial Market activities
 - Credit intermediation outside the traditional banking system: securities lending and collateral supply, credit enhancement contracts and financial guarantees

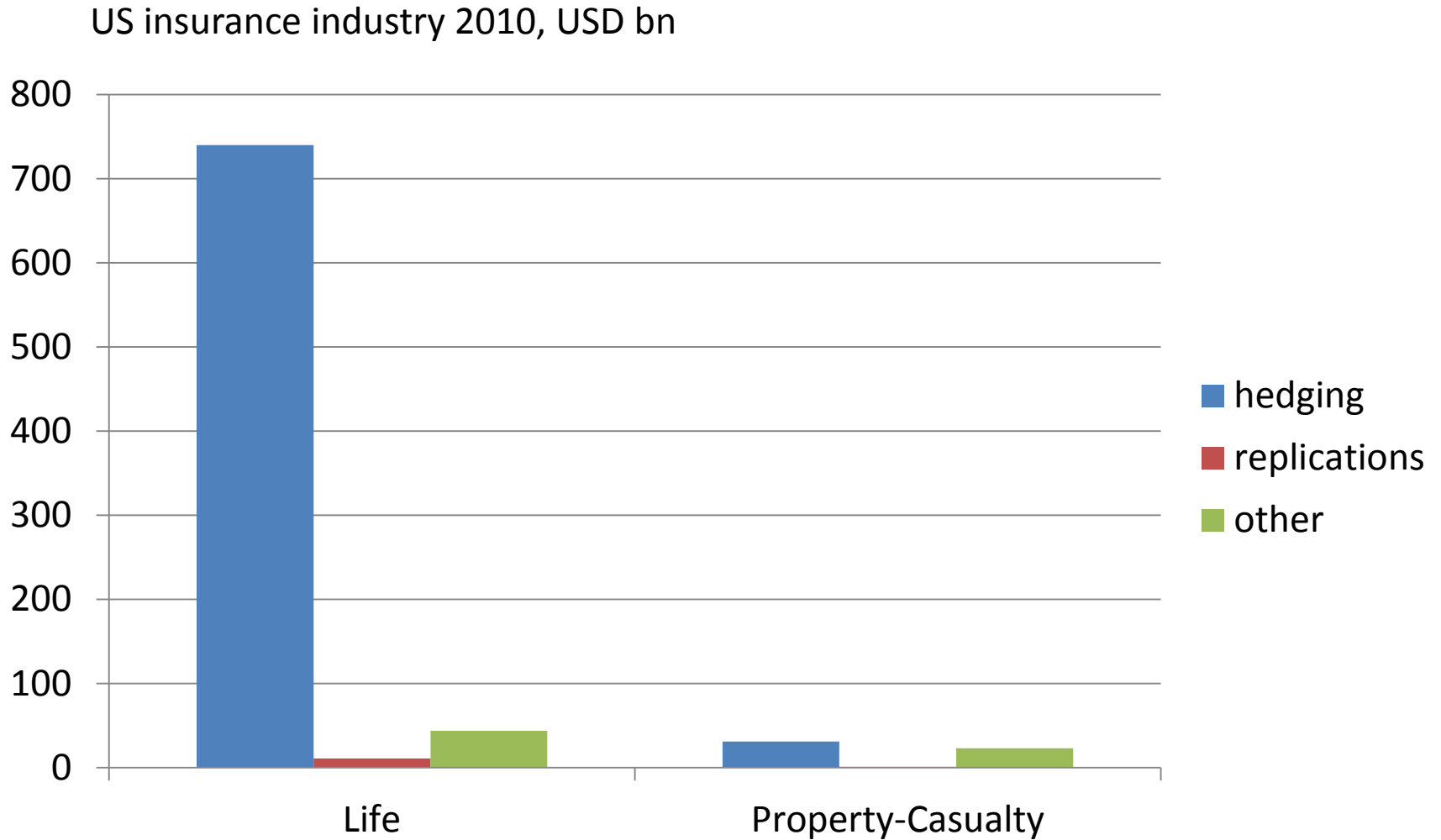
Has financial innovation changed insurers functions?

- **Risk management**
 - Derivatives, Securitization, Asset management, Financial market activities
- **Pooling of resources**
 - Securitization, Asset management
- **Transfer of resources**
 - Securitization, Financial market activities
- **Information production and incentives**
- **Payment system**
 - Financial market activities
- **Price system**
 - Asset management, Financial market activities

Derivatives: interest rate, FX, CDS



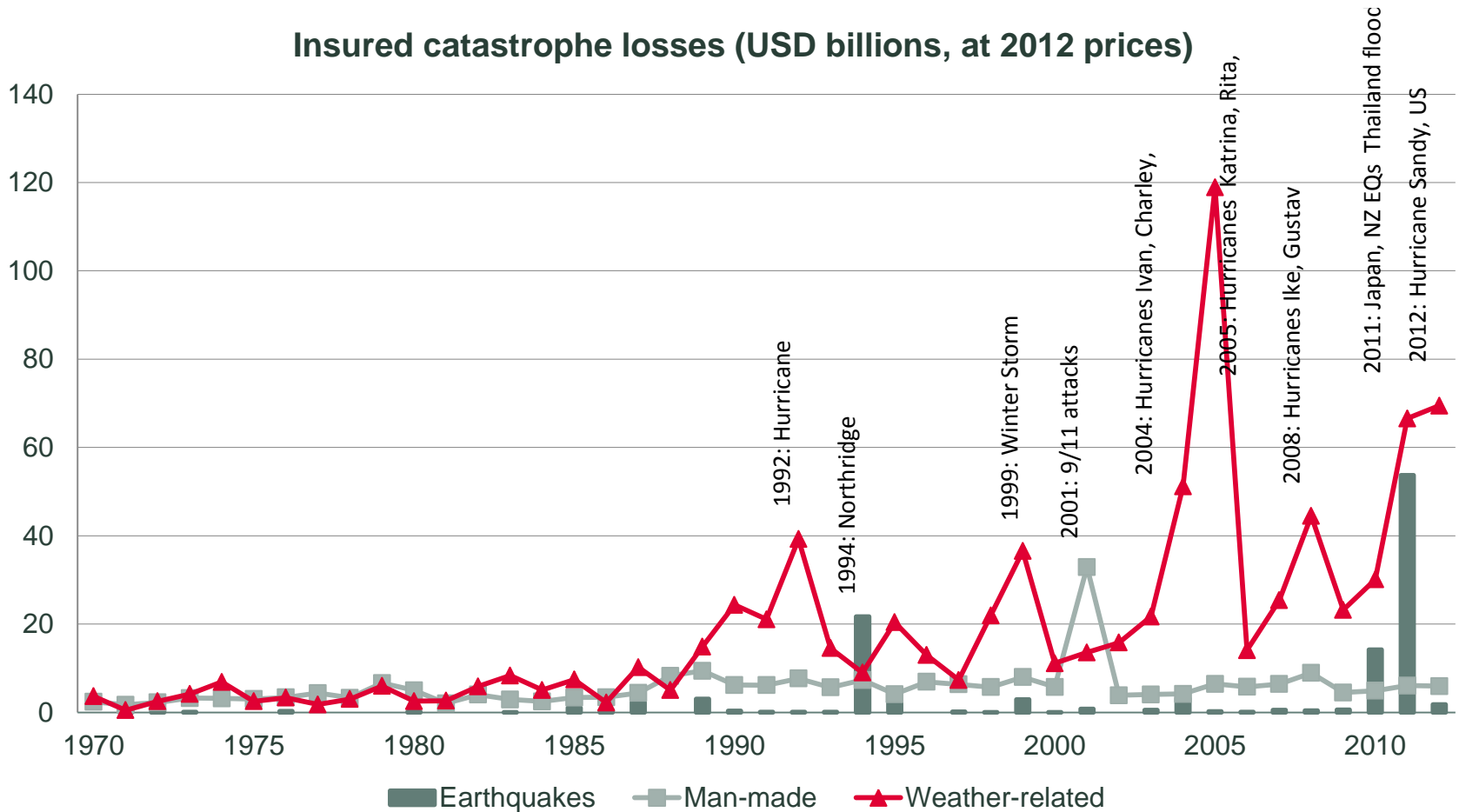
Purpose of derivatives



Derivatives

- Purpose of derivatives
 - Hedge risks in the asset portfolio
- Companies that use derivatives have larger asset-liability maturity duration gap
 - Substitution effect between the use of derivatives and reinsurance
- Intensity of derivatives usage varies across insurers
 - Participation rate is higher for larger companies
- Derivatives increase interconnection between the insurance industry and the rest of the financial system
 - Primarily OTC contracts
- How to distinguish the use of derivatives for the purpose of hedging and speculation?

Securitization of underwriting risks



Securitization of underwriting risks

- The market is small compared to reinsurance
 - Mostly concentrated in property-casualty
 - Only about 8% of cat risk is covered by securitization
- Securitization vs reinsurance
 - Reinsurance
 - Underwriting expertise, attractive tax status
 - But opaque and has limited equity capital
 - Securitization
 - Information insensitive security
 - But basis risk, less efficient use of collateral
- Important differences with consumer finance and mortgages securitizations
 - pooling does not lead to systematic exposures
 - Mostly focuses on cat risks and longevity trends, at least for now

Asset management

- In life insurance, very few contracts resemble the core insurance contract
 - In the US term life: 5.2%, immediate annuity: 1.5%
- Vast majority of contracts are a combination of
 - insurance for life related risks
 - Investment/savings
 - The value of the policy is linked to the performance of the portfolio
 - The policy offers a wide range of guarantees: minimum income, minimum cash withdrawal, growth
- The life insurance market is dominated by pension products
 - In the US, 57% of policy reserves are for variable annuity and deferred annuity contracts

Implications for insurer's business model

- **New set of competitors**
 - Mutual funds, banks
 - In response, the investment strategy must adjust
 - Asset-liability matching for life-related risks
 - Competitive pressure from other intermediaries for the investment part of the contract
- **New sources of earnings**
 - life risk contracts: underwriting and investment
 - Bundled contracts: investment and fee income
- **New sources of risks**
 - Life risk contracts: mortality, longevity, lapse
 - Bundled contracts: mortality, longevity, lapse, interest rate, equity market, inflation
- **Profile of lapse and interest rate risk change**
 - Optionality of contracts makes exposures non-linear and very complex
 - Shortened maturity of liabilities

Portfolio similarity and asset liquidation

- Basis for FSOC final determination regarding Prudential Financial
 - “A liquidation of a significant portion of Prudential assets could cause significant disruptions to key markets including the corporate debt and asset-backed securities markets. .. The Severity of the disruption could be amplified by the fact that the investment portfolios of many large insurance companies are composed of similar assets.”
- Getmansky et al (2016)
 - Link between insurers’ portfolio similarity and asset liquidation decisions
 - The link is stronger for capital constrained insurers
 - Similarity in liquidity and ratings predicts similarities in sales
 - Links are stronger during the financial crisis

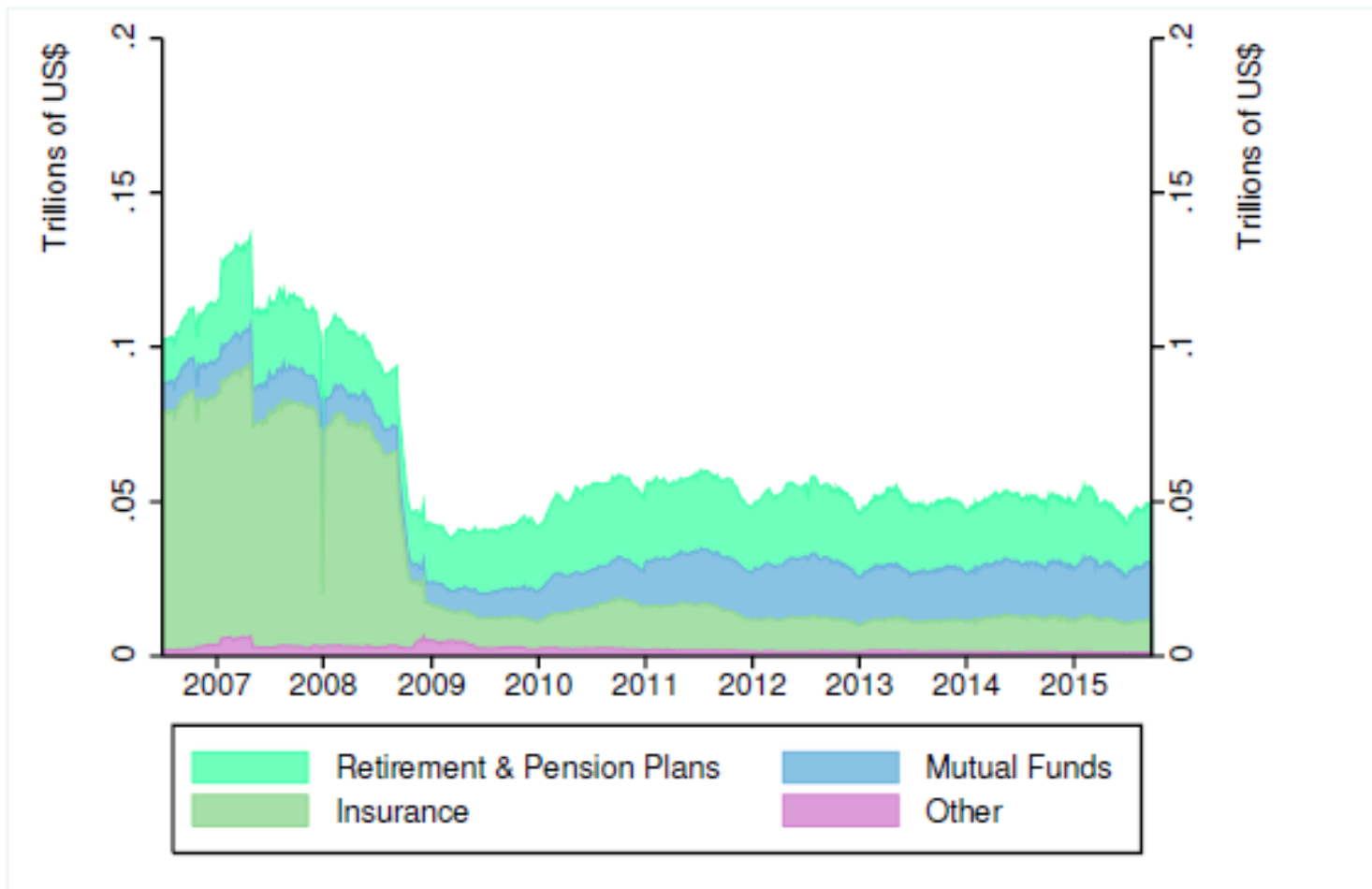
Duration mismatch can amplify yield decline

- Low for long: the effect of low interest rates on insurers
- Given duration mismatch, lower yields increase negative duration gaps
 - The value of liabilities raises faster than the value of assets
- Domanski et al (2015)
 - Hunt for duration: as long-term rates fall, the demand for long-term bonds increases further
 - Insurer's demand becomes upward sloping, amplifying the decline in yields

Financial market activities

- Securities lending
 - Insurer can earn a lending fee and investment return from reinvestment of the collateral
 - Insurer assumes credit risk
- CDS
 - Insurer sells default protection
 - This contract is different from insurance: requires collateral, has strong correlation with stock market
- Financial guarantee contracts
- These are the exposures that led to AIG collapse
- Often financial market services of insurers are used by banks to reduce their regulatory capital requirements
- Shadow banking type activities are performed by other intermediaries, insurers share in this market is not major

Life insurers lending of corporate bonds, US



Foley-Fisher et al, 2015, 2016

Can new functions be systemic?

- Asset management by insurers
 - What drives insurers' returns?
 - Can the embedded options of unit-linked contracts be hedged effectively?
 - Does it amplify the asset liquidation risks?

- Financial market activities
 - What are the economic incentives to participate in this activities?
 - Comparative advantage or regulatory arbitrage?
 - How to measure the risks to insurer and the financial system from these activities?

- Asset management and financial market activities have many cross sectoral aspects that are poorly understood

Implications for regulation of systemic risk

- Innovations mean new opportunities and risks
- Distinction between exposure and contribution to risk
 - Insurers are exposed to potential risk arising from financial innovation if these innovations are used to enhance the efficiency of performance of the core functions
 - However, new functions may imply contribution to risk, some of which is systemic
- Role of an institution and interaction among institutions
 - How critical is a particular institution for the performance of a function?
 - How correlated is the behavior of institutions contributing to a function?
 - How the organization of the institution affects its involvement in various functions?