Risks in Insurance Markets: Recent Trends and Transmission Mechanisms[1]

Ralph S.J. Koijen[a]

[a]NYU Stern, NBER, and CEPR

[1]Based on joint work with Motohiro Yogo (Princeton University and NBER).

Overview

- Traditional risks:
  1. Interest rates.
  2. Aggregate longevity or mortality.
  3. Policyholder behavior.
- Changes in risks and risk management practices of modern life insurers:
  1. Minimum-return guarantees (variable annuities).
  2. Shadow insurance.
  3. Securities lending.
  4. Derivatives.

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  2. Shadow insurance.
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  4. Derivatives.
- Objectives:
  1. Summarize recent trends for U.S. life insurers.
  2. Discuss potential amplification and transmission mechanisms.

Themes

1. Risk concentration: Aggregate activity for industry mostly due to top 10 financial groups.
2. Individual risk exposure easier to quantify, but overall risk mismatch is much harder.
3. Poorly designed accounting standards and capital regulation can have unintended consequences. Life insurers increase risk to improve RBC.
    - Investment: Ellul et al. (2011), Ellul et al. (2012), and Merrill et al. (2012).
    - Product market: Koijen and Yogo (2015).

Life insurers during the 2008 financial crisis

- AIG lost $21 billion from securities lending, compared with $34 billion from CDS (McDonald and Paulson 2014).
- Hartford also received TARP because of VA losses.
- Others involved in VA or securities lending applied for TARP: Allstate, Genworth Financial, and Prudential Financial.

Composition of life insurance liabilities

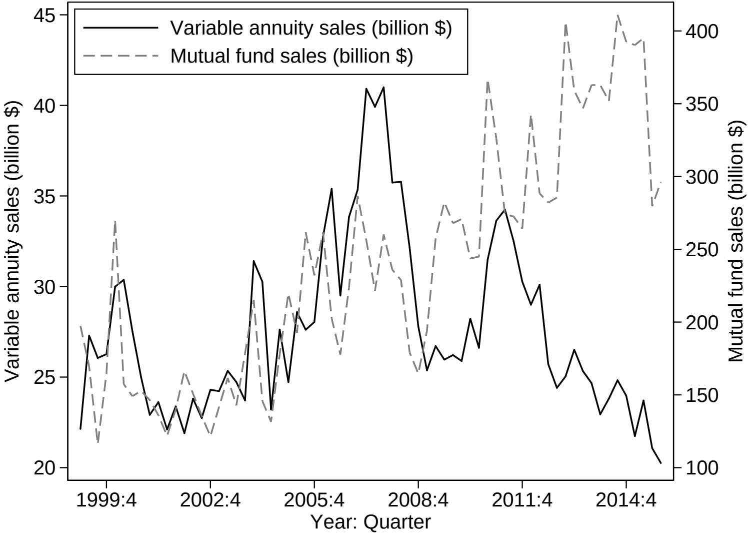
Liability	Trillion $
Variable annuities (separate accounts)	1.8
Life insurance	1.5
Traditional annuities	1.0
Pension fund liabilities	0.7
Other reserves (accident & health)	0.3

Risk-sharing functions of life insurers:

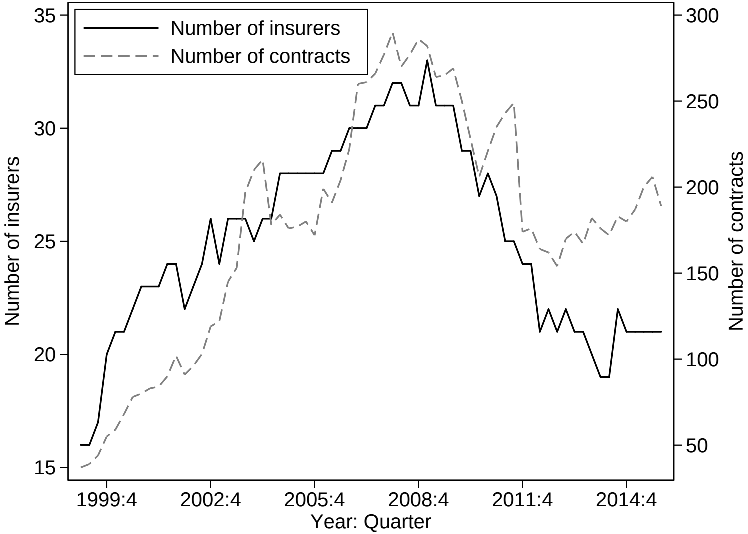
1. Diversify idiosyncratic risk.
   - Traditional life/health products.
2. Market risk insurance.
   - Variable annuities = Mutual fund + Long-dated put option.

- The long-term nature of the guarantees can lead to duration mismatch (ESRB, 2015).

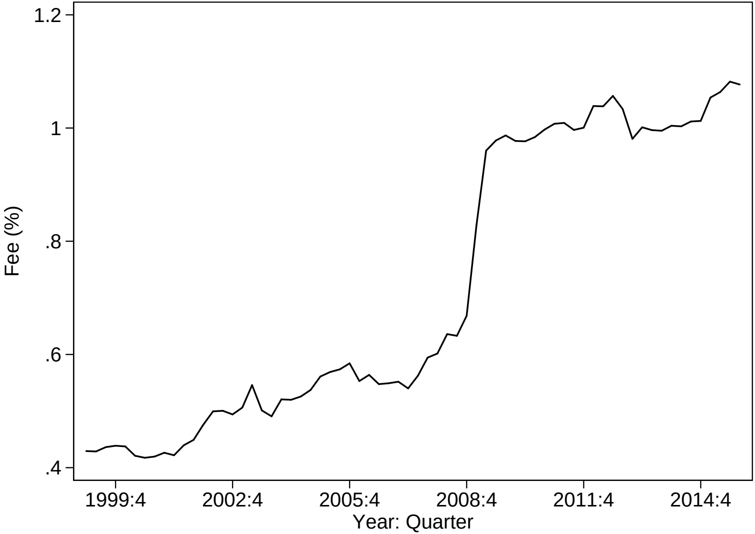
Variable annuity sales



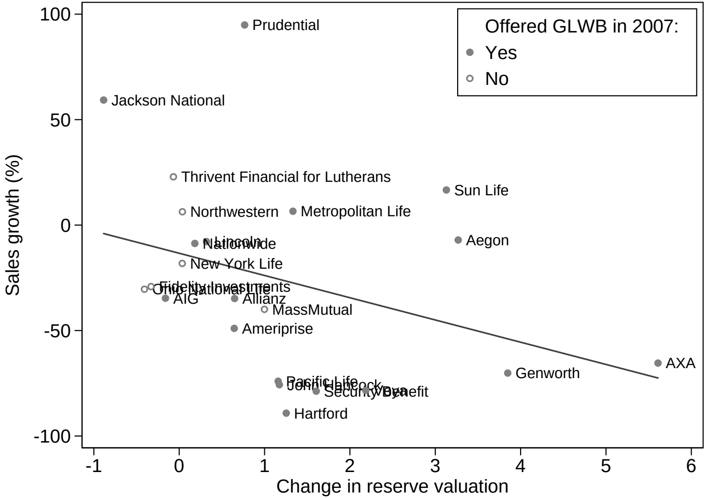
Number of insurers and contracts offering VA guarantees



Fees on variable annuity guarantees



Sales growth versus change in reserve valuation



Shadow insurance

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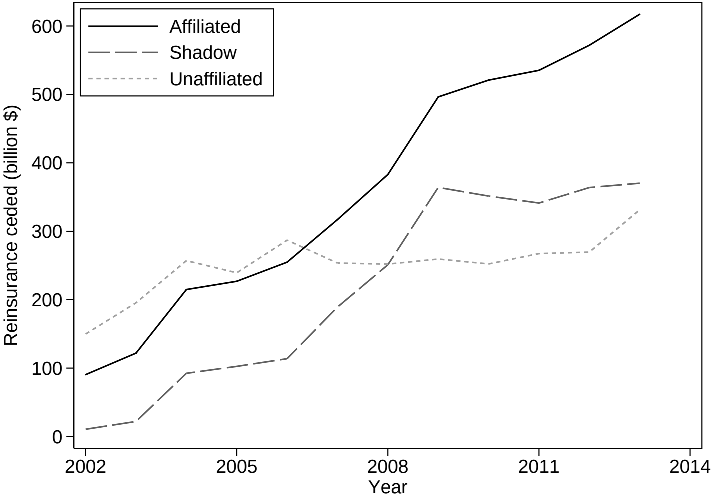
1. Liquidity risk from mismatch between LOC and insurance liabilities.
2. More investment risk?
3. Less equity and higher leverage?
    - Lawsky (2013): Conditional LOC and naked parental guarantees.
    - Iowa released financial statements for 8 captives in 2014. Under statutory accounting, surplus would be −\$2.7 billion (instead of \$1.5 billion).

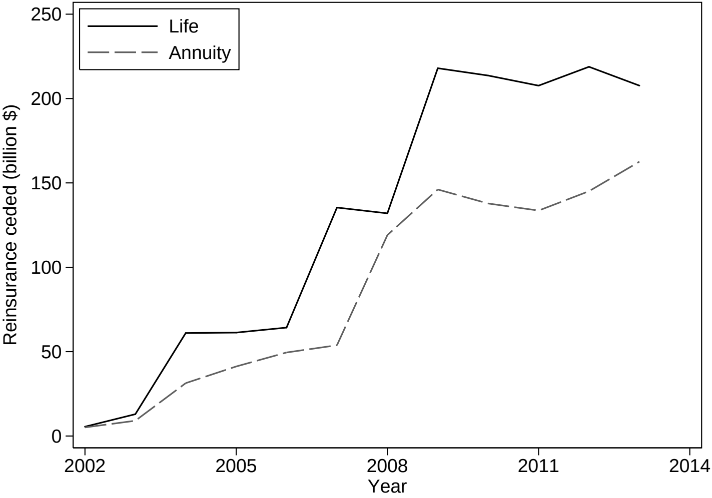
Top 10 financial groups by shadow insurance

Financial group	Reinsurance ceded (billion $)
John Hancock Life Insurance	118
MetLife	45
Athene USA	40
Hartford Life	40
Aegon USA	30
Great-West Life	14
Voya Financial	13
AIG Life and Retirement	12
Global Atlantic	11
Lincoln Financial	7

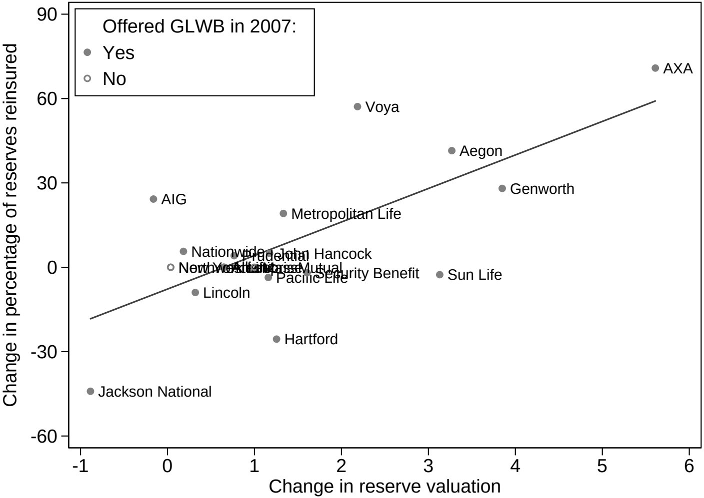
Reinsurance ceded to affiliated, shadow, and unaffiliated reinsurers



Life versus annuity reinsurance ceded to shadow reinsurers



Variable annuity reinsurance

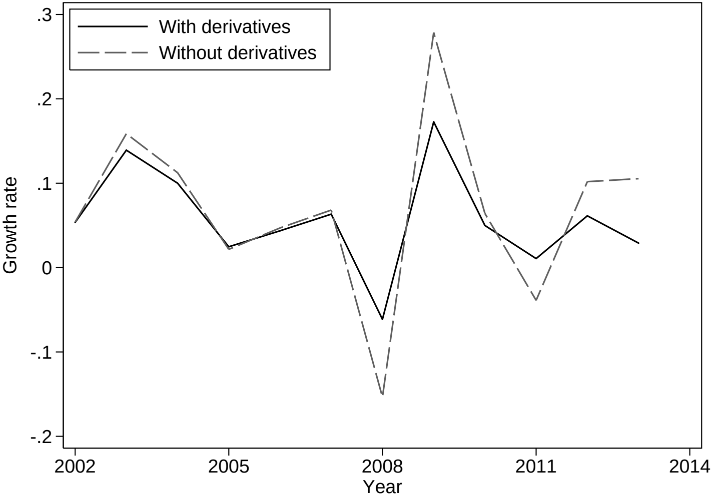


Do derivatives hedge volatility?

- Total notional amount of OTC derivatives held by U.S. life insurers was $1.1 trillion in 2014 (Berends and King 2015).
- Question: Hedge or amplify volatility? Derivatives amplify volatility for banks (Begenau et al. 2015).

1. Basis risk
   - Long duration of VA guarantees.
   - Hedge statutory, GAAP, or economic capital?
2. Counterparty risk

Growth rate of capital and surplus with and without derivatives



Potential transmission mechanisms

1. Banks:
    - Captive reinsurance funded by LOC.
    - Counterparties in securities lending and derivatives.
    - Funding through corporate bonds.
2. Corporate bond market:
    - Fire-sale dynamics (Ellul et al. 2012).
    - Higher borrowing costs for firms.
3. Households:
    - Solvency worries could lead to debt overhang and collapse in demand.
    - Increase in precautionary saving and welfare loss.

Property and casualty insurance

- P&C reinsurance markets are subject to "reinsurance cycles."
  - Following disasters, prices rise, which is primarily driven by a contraction in supply.
- Following the financial crisis, there has been a large inflow of non-traditional capital (SWF, PF, HF, . . .), which lowered spreads.
- Question is whether the non-traditional capital is more "flighty" than traditional reinsurance capital, thereby amplifying reinsurance cycles.

Surplus of Iowa captives based on Iowa versus statutory accounting

Captive	Iowa	Statutory
Cape Verity I	27	-432
Cape Verity II	140	-548
Cape Verity III	54	-169
MNL Reinsurance	118	118
Solberg Reinsurance	207	207
Symetra Reinsurance	20	-51
TLIC Riverwood Reinsurance	817	-1,113
TLIC Oakbrook Reinsurance	114	-675
Total	1,497	-2,663