Discussion at FDIC on Measuring and Managing Systemic Risk

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Tsunami vs Contagion view of Systemic Risk

- <u>Tsunami view</u>:

- A large shock, e.g., house-price or oil-price or sovereign bond decline
- Exposed financial firms
- *En masse* failures with consequences for the real economy

- <u>Contagion view</u>:

- A shock to a firm
- Financial firms exposed to this firm

Tsunami vs Contagion view of Systemic Risk

- Tsunami view:
- A large shock, e.g., house-price or oil-price or sovereign bond decline
- Exposed financial firms
- *En masse* failures with consequences for the real economy
- Contagion view:
- A shock to a firm (idiosyncratic?)
- Financial firms exposed to this firm (beneficiaries too?)
- *En masse* failures?
- The two views are not orthogonal: contagion worse after a Tsunami

NYU-Stern (V-LAB) Market-based Stress Test

- Systemic risk of a financial firm = *e. SRISK*, where

e = Going-concern externality (e.g., credit crunch, zombie lending)

SRISK = E [Capital Shortfall | Crisis]

= E [Required Capital – Actual Capital | Crisis]

= k * Debt – (1 – k) * *MES* * Equity; *MES* = E [% Loss on Equity | Crisis]

- Capital Shortfall = *f ({r}, L, Size), {r}* = asset/loan returns; *L* = leverage

-> <u>Nice property of separability of systemic risk contributions</u>

- Exogenous crisis = *g ({r})*; V-LAB: Market return is less than -40% over 6m
- Endogenous crisis = *g [{r}, f({r}, …)]*

-> <u>Can help estimate a Distance to a Financial Crisis</u>

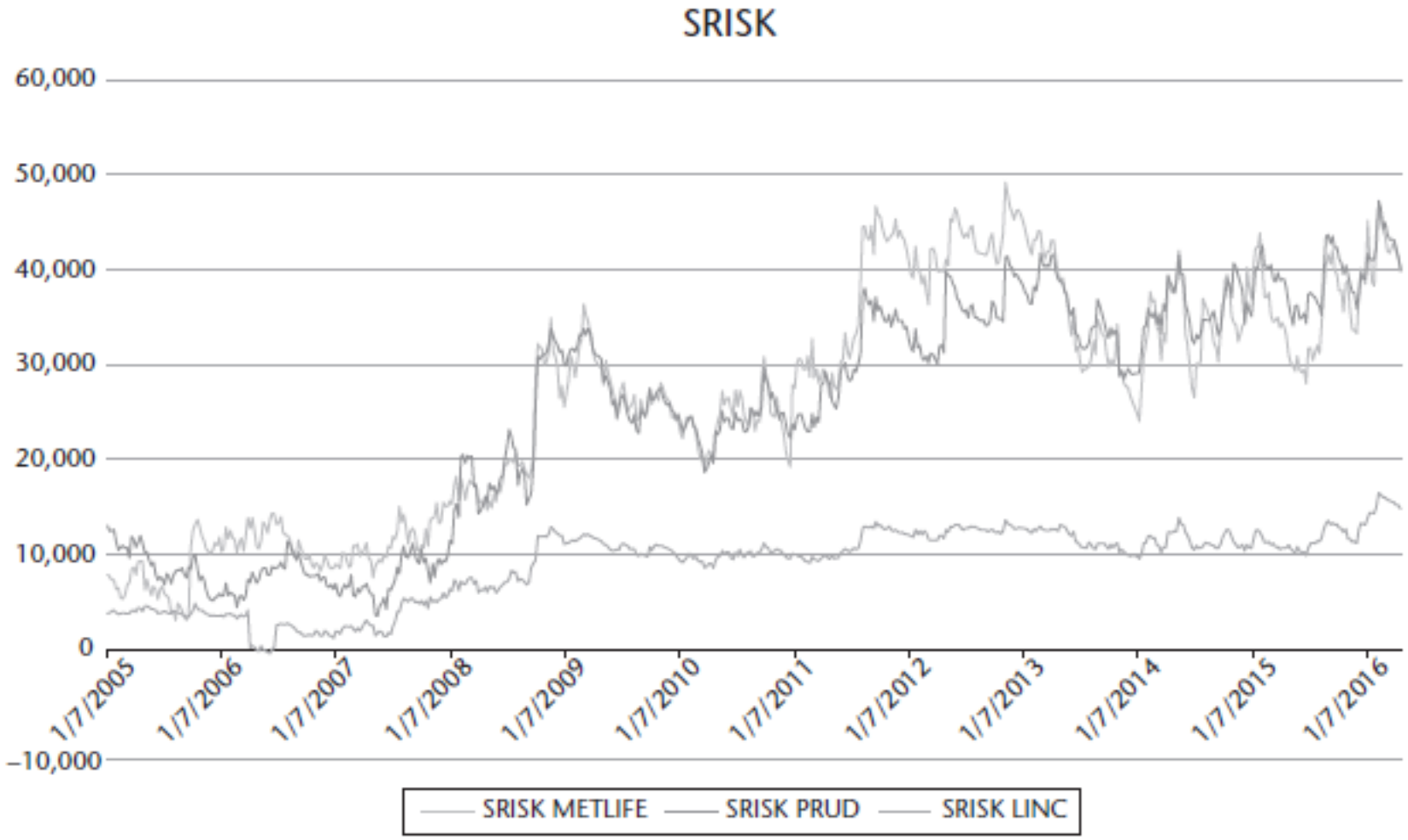
E.g., what probability of shocks *{r}* that lead to Capital Shortfall > *x*% of GDP?

Thinking of Insurance Firms vs Banks

- Requires expanding the scope of the framework to allow for fire-sale style externalities ("indirect effects", "liquidity effects")
  - A common criticism of V-LAB and regulatory stress tests (both solvency tests)
- Externality multipliers arise starting at two critical "Crisis" levels:
  - Once fire-sales take place (liquidity problem), and
  - Once going-concern externality arises (solvency problem)
- The two generally feed on each other
- Banks likely to contribute to both given the presence of short-term debt and the mix of lending and trading activities in modern banking
- Insurance firms?

Thinking of Insurance Firms vs Banks

- Traditional insurance firms versus banks
- Typically no short-term debt or debt contingent on aggregate financial shocks, so only going-concern externality
- Modern insurance firms: AIG, Hartford, MetLife
- Margin calls, guarantees, broker-dealer style trading books
- Insurance systemic risk contributions appear to have gone up!
  - More leveraged than banks at present
  - Provide guarantees and synthesize off-balance-sheet reinsurance leverage
  - Play a significant role in the provision of capital to corporate bonds and commercial mortgage-backed securities


SRISK
60,000
50,000
40,000
30,000
20,000
10,000
0
–10,000
1/7/2005
1/7/2006
1/7/2007
1/7/2008
1/7/2009
1/7/2010
1/7/2011
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SRISK METLIFE
SRISK PRUD
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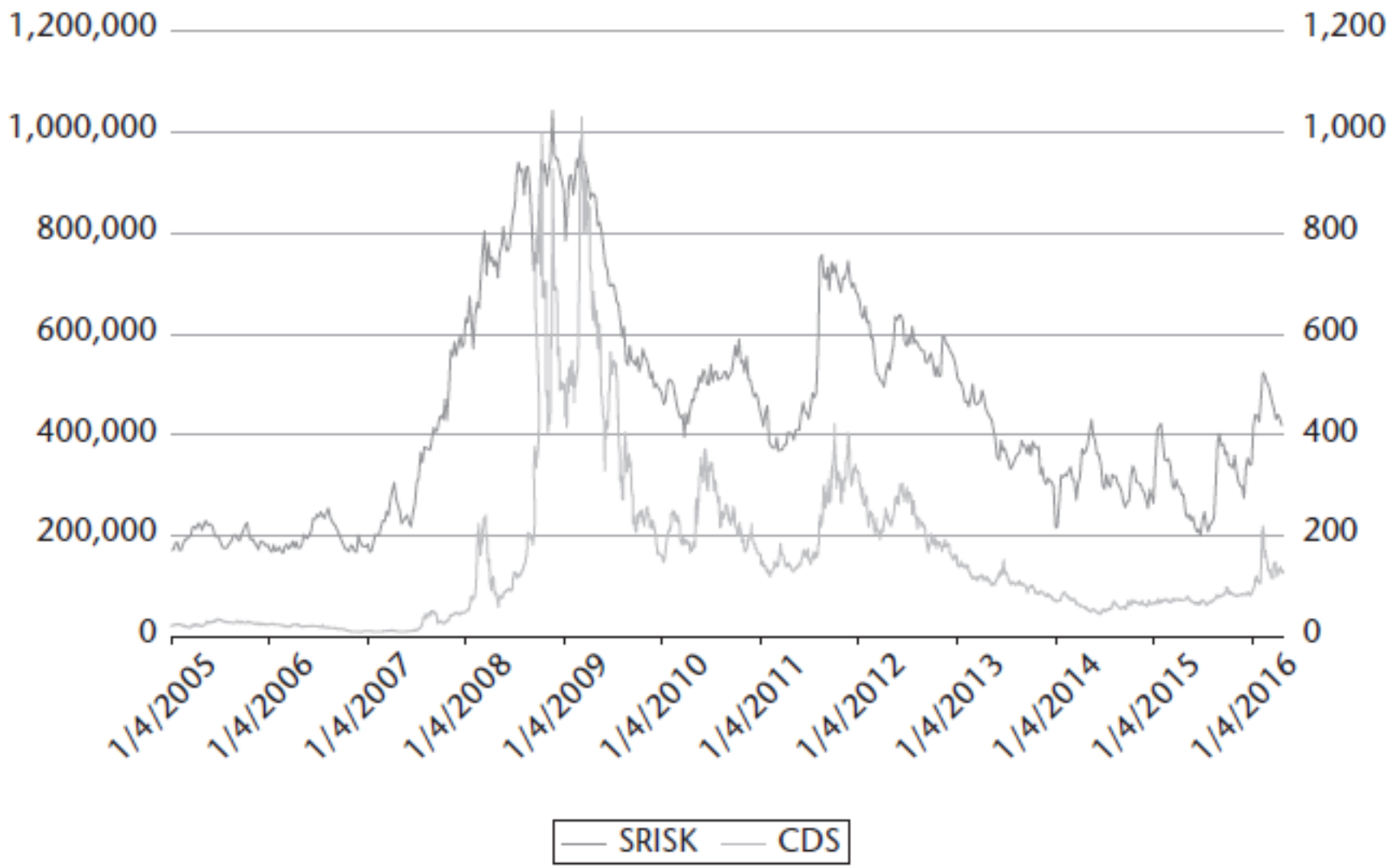

Figure 5.2. CDS Premium of Metlife

Interconnected financial firms

- The basic V-LAB framework runs into issues!
- *{r}*, e.g., asset/loan returns insufficient to map (readily) into a firm's returns
- *f_i ({r}, …, {f_k})* are determined in equilibrium as fixed points given each firm has contracts (inter-bank deposits, derivatives, etc.) whose returns depend on the performance of other firm(s)
  - Likely as complex non-linear interactions between *{r}* and *{f_k}* due to default considerations
- <u>Separability in systemic risk contributions? Who should "pay"?</u>
- How should we regulate such risk?
- By limiting or taxing interconnectedness or leverage of certain types?
- Important to know the <u>exact source</u> and <u>conditionality</u> of contagious spillovers
- Establishing carefully the return lead-lag relationships, and how they change <u>conditionally</u>, is a good start!!

Interpretation of lead-lag relationships

- In asset-pricing and information theory, the lead-lag relationship structure of returns has been attributed to information flows
- Important benchmark: If firm returns are determined in equilibrium as fixed points, but are driven by some exogenous shocks, then with high enough market efficiency (say, at daily level), there should be no lead-lags observed in data
- What do the lead-lags capture?
- Actual linkages, i.e., inter-connectivity through contracts, which are discovered by the market only gradually, or merely flows (information updating) about asset quality, funding model risks, etc.?
- The failure of Northern Rock in Sep 2007 affected players in the UK such as Alliance and Leicester, and HBOS, that were not connected to Northern Rock but had similar assets and business models.

Cross-border banking flows

- Bank for International Settlements (Hyun Shin, in particular) have flagged this as a source of financial fragility and international spillovers
- <u>Some open questions</u>:

- Maturity of the flows? Short-term inter-bank deposit flows may be quite volatile ("sudden stops") in contrast to long-term flows
- Within-bank subsidiary flows or across-bank flows?
- Efficiency due to diversification and reduction of foreign exchange risk?
- Is the driver cross-border flows or the underlying nature of business?

- Would *within-country* analysis be a better way to get at causality?

Alternative Hypotheses

- Example 1: Indian public-sector banks have fewer cross-border flows, greater leverage, poor asset quality, and higher systemic risk; not too sophisticated to have cross-border flows compared to private banks which have more flows, less leverage, better assets, and lower systemic risk

- Example 2: Large banks are generally viewed to have access to greater government guarantees, and due to resulting lack of market discipline, may operate at high leverage and poor asset quality; nevertheless, attract greater cross-border flows due to the perception of government backing