Discussion of Sen and Sharma (2020)

"Internal Models, Make Believe Prices, and Bond Market Cornering"

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Overview

Objective

- Examine the economic implications of reporting discretions related to asset holdings

Approach

- Data: Detailed corporate bond holdings of life insurers
    - Variations: Across states, bonds, insurers

Result

- US life insurers over-report the value of corporate bonds to increase regulatory capital
    - Drivers: State-level regulation, opaque prices, level of capital
- Implications: (1) Allocation towards opaque bonds and (2) "Cornering" of small bonds

Plan for Discussion

- Big Picture
- Results on Ex-Post Insurer Behavior
- Results on Ex-Ante Insurer Behavior

Big Picture

Overview & Empirical Setting

1. Asset Demand

- Insurers: impact of incentives induced by regulation on asset holdings
- Corporate bonds: concentration

2. Financial fragility

- Internal risk models are widely used and important sources of systemic risk
- Most empirical evidence focuses on banks and the riskiness of loans

*3. Demand for liquidity? Demand for illiquidity?

- Demand for liquidity: transaction costs
- Demand for illiquidity: regulatory constraints

Key Regulatory Peculiarity

1. Insurers are forced to revise valuations only when a bond is deemed impaired.
2. When reference prices are not available, insurers are allowed to use internal models.
3. Internal models are not subject to robust government oversight.

Therefore, there might be incentives for insurers to:

- Use internal models rather liberally to take on more risk than is advised (ex-post)
- Select into assets that help them take advantage of this regulation (ex-ante)

Main Results

1. Prevalence of Internal Models

• ~26.5% of assets are valued using internal models for the largest 20 insurers in 2008.

Insurer	Total assets ($ Billion)	Internal models share (%)
MetLife	471	42.2
Prudential Financial	389	42.9
AIG	380	13.1
Hartford	271	14.2
Manulife Financial	219	35.6
TIAA	200	0.7
Aegon	199	0.4
New York Life	196	23.3
ING	191	26.3
AXA	160	1.3
Northwestern Mutual	157	29.6
Lincoln National	156	2.0
Principal Financial	136	26.5
Massachusetts Mutual	132	56.9
Nationwide	111	29.9
Pacific Life	99	44.8
Allstate	90	31.0
Ameriprise Financial	85	100.0
Jackson National	81	11.1
Genworth Financial	71	19.9

Main Results

1. Prevalence of Internal Models

2. Credit Spreads

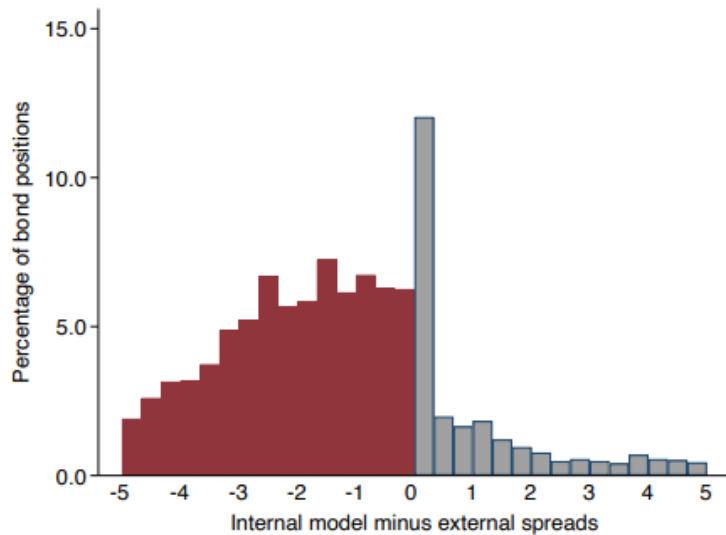- Spreads of IM and Non-IM bonds diverge during the crisis.
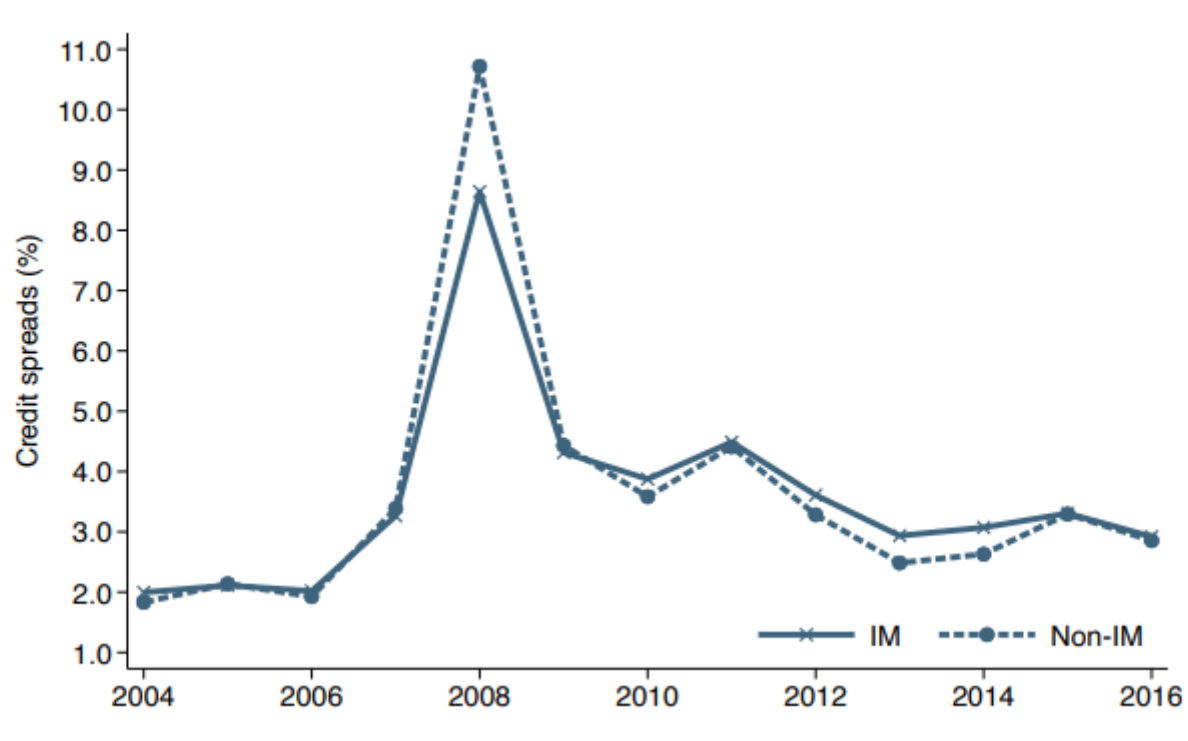
Main Results

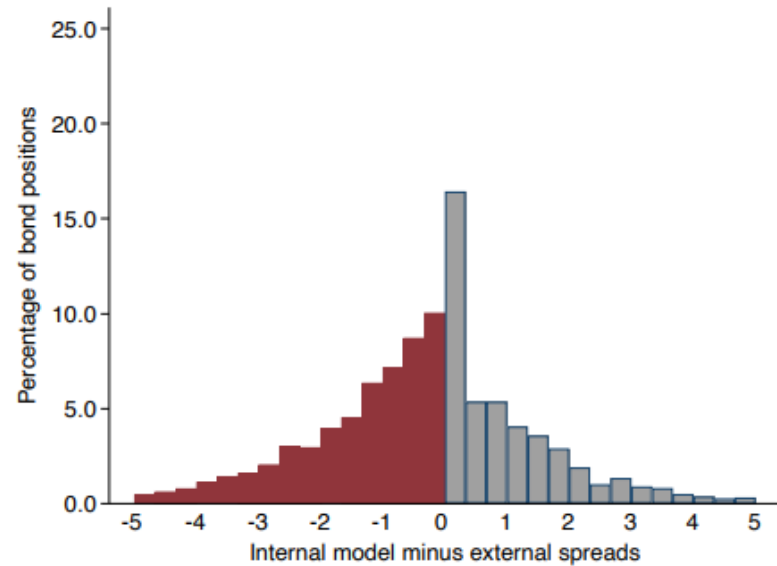**1. Prevalence of Internal Models**

2. Credit Spreads

3. Misreporting Incentives

- "Misreporting" is more prevalent when revisions are more likely.

(a) Incentive to misreport
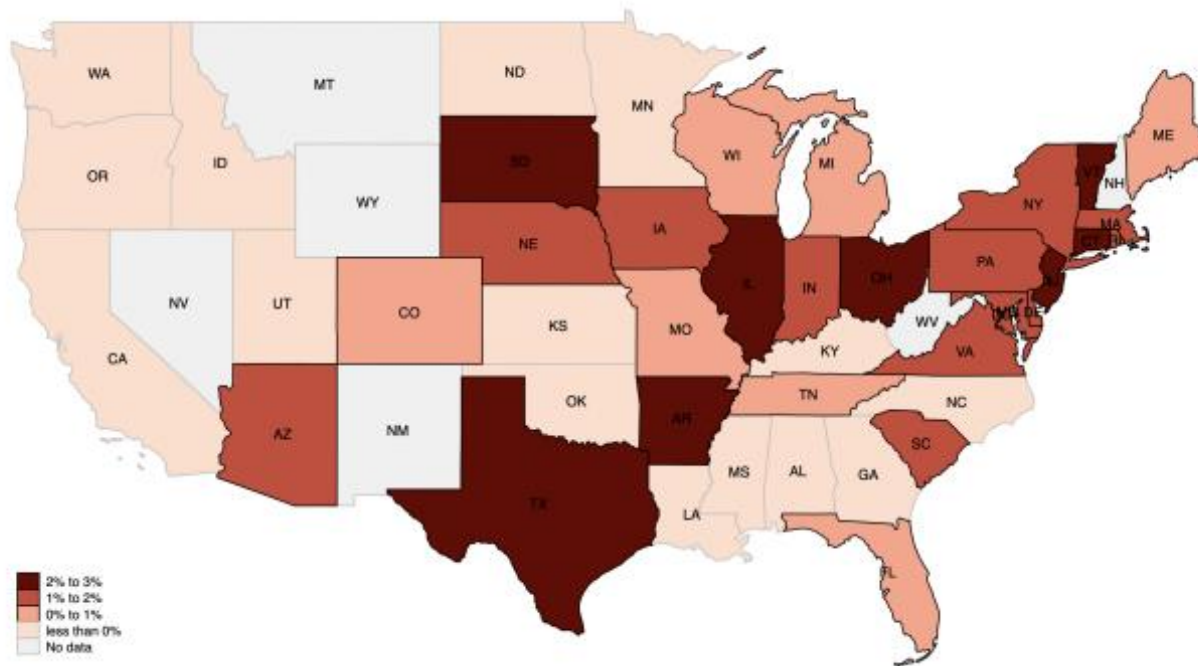
(b) No incentive to misreport

Main Results

1. Prevalence of Internal Models

2. Credit Spreads

3. Misreporting Incentives

4. Origins of Persistent Misreporting

•   Misreporting varies across states and across bonds

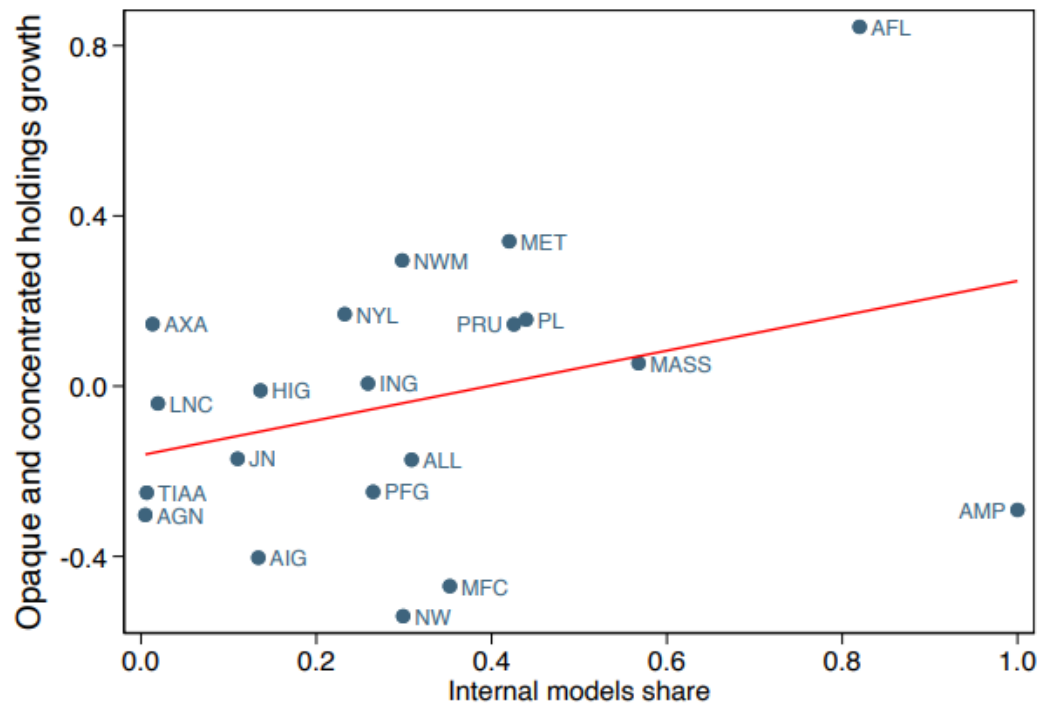# Main Results

1. **Prevalence of Internal Models**
2. **Credit Spreads**
3. **Misreporting Incentives**
4. **Origins of Persistent Misreporting**
5. **Regulatory Incentives and Asset Demand**
- Insurers may demand bonds with few holders, opaque prices, and lack benchmarks

Results on Ex-Post Insurer Behavior

#1 Heterogeneity in Internal Model Use

Insurer	Total assets ($ Billion)	Internal models share (%)
MetLife	471	42.2
Prudential Financial	389	42.9
AIG	380	13.1
Hartford	271	14.2
Manulife Financial	219	35.6
TIAA	200	0.7
Aegon	199	0.4
New York Life	196	23.3
ING	191	26.3
AXA	160	1.3
Northwestern Mutual	157	29.6

Question: Where is this striking heterogeneity in the use of internal models coming from?

Suggestion: Can we see additional versions of this table?

1. Internal models share at the company level
   - Is the 13.1% of AIG coming from only a few subsidiaries, or is it evenly spread across the entire subsidiaries?
2. Internal models share by # of corporate bonds rather than their par value
   - This would be a way to get at how much "effort" each insurer puts in to "misreport"
   - Also relevant for later regressions as well

#2 Misreporting vs. Bad Internal Model?

Authors:
- "Insurers with internal models report credit spreads 120bps lower than insurers that use external sources to value the <u>same</u> bond during the financial crisis"
- "This is due to systematic under-reporting of spreads when revisions are likely"
- Also in the title: "make-believe" prices

Question: Is it possible that this discrepancy is a feature of the internal models they use?
- Suppose X is an input to an internal model that is correlated with financial crisis (e.g. liquidity). Then a drop in X, which happens only during crises, leads to much lower internal valuations compared to those in peacetime
- If X differentially impacts the internal valuation of corporate bonds depending on whether it's heavily impaired or not, then the insurer fixed effect and the insurer fixed effect will not be able to capture this omitted variable.

Suggestion: Survey life insurers regarding their use of internal models
- I would ask:
  - What variables enter the internal models, and how do they enter?
  - What goes into their decision to use internal models, even in the presence of external prices that are available?
- This exercise will also shed light on why certain insurers never use internal models.

Minor Questions

- For measuring supervision at the state level, why is the total # of financial exams scaled by the number of insurers?
    - I agree that # of examiners and budget should be scaled (as the authors already do)

- Is there a time-series variation in both the misreporting and supervision? If so, can we estimate a panel version of equation (7)?

$$(7) \qquad Missreporting_s = \alpha + \kappa(Supervision_s) + \beta X_s + \epsilon_s,$$

- How dispersed are the valuations of insurers who obtain prices from external sources?
    - Related Q: What prevents an insurer from using prices from another state?

- How do the results compare to other financial institutions like banks?
    - If they do not face a similar incentive, cross-institution comparison may also be convincing.

Ex-Ante Insurer Behavior

#1 Ex Ante Asset Selection

Authors:

- Does asset selection respond to incentive problems?

$$Holding\ Share_{i,t} = \sum_{t=1,2,3,4} \delta_t(HDI_i \times Period_t) + \beta X_{i,t} + \alpha_i + \alpha_t + \epsilon_{i,t},$$

  where the sample is split into four periods (pre-, during, immediately after, and post)
- They find that $\delta_2, \delta_3 > 0$ and $\delta_4 \approx 0$
- Note: The estimates are relative to the base period, which is pre-crisis/

Question #1: Why not just add year dummies?

- Current interpretation of result: "persistence after the crisis"
- Looking at year dummies may be more convincing for this particular interpretation.

Question #2: What is HDI_i capturing?

- = Willingness to exploit reporting discretion in the cross-section
    - Equals 1 if it's in the top 50% of internal models share in 2008
- Alternate measure 1: # of corporate bonds internally valued / total # of bonds
- Alternate measure 2: same as authors' but conditional on possibility of impairment
- Potentially useful: Scatterplot of HDI_i against insurer size
    - Would immediately dispel some of the concerns mentioned by the authors

#2 More on Asset Selection

Authors:

- "This paper… understand concentration in the ownership patterns of corporate bonds."

Question: Why stop here? Why not the entire pattern of corporate bond holdings?

- How important is the regulatory incentive quantitatively for corporate bond holdings?
- How does it compare to the traditional drivers?
    - Maturity, Credit Rating, Covenants and seniority, Currency denomination, Callability

Suggestion: Add regulatory incentive to the corporate bonds demand system

- Authors have another paper that estimates corporate bond demand at an institutional level
    - Bretscher, Schmid, Sen, and Sharma (2020)

- I see two ways in which the regulatory incentive can be introduced
    - One is to add insurer-specific variable that varies over time as a measure of the incentive
    - The other is to construct a bond-specific variable that captures the tendency to be "cornered" by the insurers (or just opacity in general)

#3 How do issuers respond to "cornering"?

Question: Can this explain the large # of bonds issued by a single company?

Exhibit 4: BONDS AND SHARES OUTSTANDING OF TOP US INVESTMENT GRADE BOND ISSUERS

Issuer	Bonds in Barclays US Corporate Index	Share of Dollar Amt Outstanding	Total Bonds Outstanding	Common Equity Securities	Preferred Equity Securities
Bank of America	53	46%	1,295	1	33
General Electric	48	36%	905	1	4
Verizon	42	83%	73	1	0
JP Morgan	45	40%	1,695	1	5
Goldman Sachs	28	44%	1,488	1	8
Citigroup	42	35%	1,865	1	11
Morgan Stanley	27	42%	1,331	1	13
AT&T	43	63%	85	1	0
Wells Fargo	37	39%	304	1	9
Comcast	36	88%	56	1	0

Sources: Barclays and Bloomberg, April 2014. Note: Table shows issuers with the largest notional amount outstanding in the Barclays US Corporate Index. Reference to issuers is for illustrative purposes only, and should not be construed as investment advice or investment recommendation of those companies.

Minor Questions

- For "cornering" to work, do you not need to obtain the issuance in its entirety?
    - Suppose I acquired all issues of bond X except for 10 issues. Wouldn't this still make the reference prices available?
    - In other words, is there a difference in incentive for the insurer to acquire all bonds except for 10 vs. all bonds except for 100?

- Minor institutional question: If the bond is held by one insurance company and stays on the book for a long time, what "market value" does the insurer report?

Final Thoughts

- Authors study an important question that (1) enhances our understanding of the corporate bonds market and (2) potential sources of financial fragility that may be overlooked

- They do a very careful job in documenting the usage of internal models and the extent of mispricing across insurers and bond types

- I am not yet convinced (but almost!) that this is indeed misreporting "make-believe" prices (as opposed to the use of sub-optimal internal models by the insurance companies).
    - Looking into how and why insurers use (or do not use) internal models would be very helpful in answering some of the aforementioned questions

- The section on cornering could be extended to address broader implications regarding institutional demand for corporate bonds

- Very cool paper that touches on both asset pricing and risk management!
- I learned a lot while reading and kept asking myself, "how did I not know about this?"