In Safe Hands: The Financial and Real Impact of Investor Composition Over the Credit Cycle

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The Importance of Investor Composition Over the Credit Cycle

- Last 20 years: rising prominence of bond financing, non-bank financial intermediation
  - Important to understand how different intermediation structures impact financial stability
- This paper: causal evidence for role of institutional ownership structure in credit cycle
  - Show that bonds held by stable, long-term investors (*safe hands*) fall in value less in crises
- Real consequences: credit disruptions impact capital allocation and firm investment

Investor Composition and Bond Price Dynamics: Causal Estimates

- Large-scale security-level holdings: insurers (US), mutual funds and ETFs (US, global)
  - Funds flightier than insurers because of exposure of liabilities to *sudden withdrawals*
- Study corporate bonds with *different* investor bases but *same* issuers, characteristics
- Residual variation driven by institutional features, leading to *shift-share IV* approach:
  - Large insurers mostly buy at issuance and do little trading afterwards
  - They also tend to buy few bonds, generating idiosyncratic holdings at bond level
- Increasing insurers' holdings by 50 p.p. leads to price declines that are 20% shallower

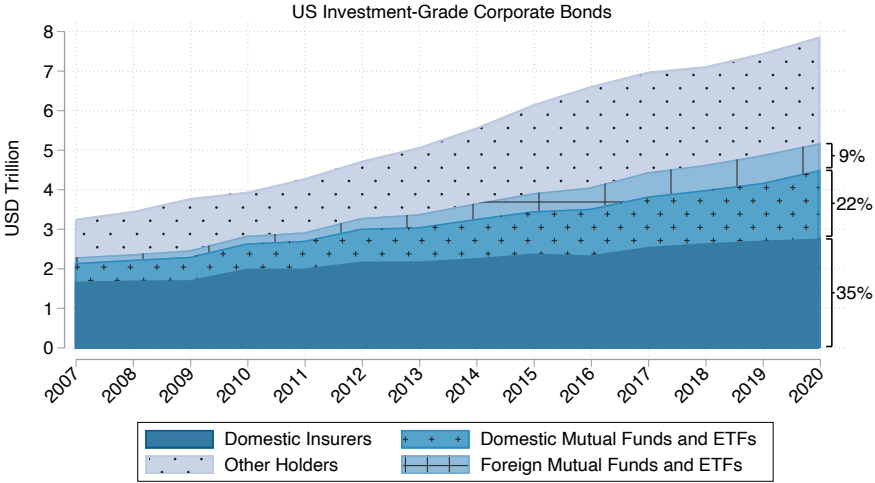
Ramifications: Global Markets, Real Outcomes, and Regulatory Tradeoffs

- These empirical patterns are pervasive across countries: US, Europe, Canada, UK
- Aggregation to explore real firm outcomes: liquidations trigger cutbacks in financing
  - Increasing insurer holdings by 50 p.p. $\rightarrow$ 1.5% higher investment rates (CAPX) in '08-09
  - Higher probability of new issuance in crisis (25% per year), lower cost of capital (120bp)
  - Impact especially strong for firms with high debt due, which face rollover issues
- Tradeoff from macro-prudential perspective: financial stability vs. liquidity provision

Related Literature

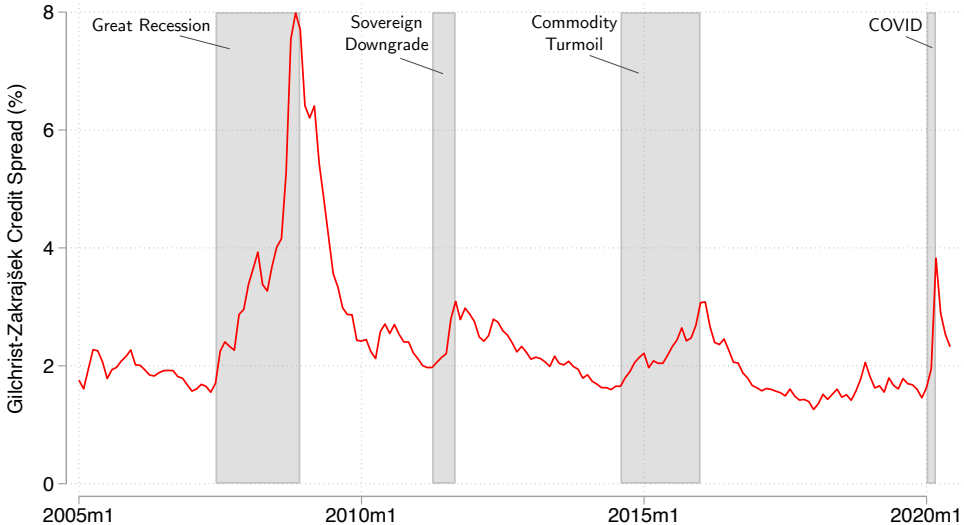
- **Fire Sales and Endogenous Amplification:** Williamson (1988), Shleifer-Vishny (1992), Kiyotaki-Moore (1997), Bernanke et al. (1999), He-Krishnamurthy (2013), Brunnermeier-Sannikov (2014), Di Tella (2017)
- **Portfolio Balance and Institutional Demand:** Modigliani-Sutch (1966), Brainard-Tobin (1968), Kouri (1976), Gromb-Vayanos (2002), Hu et al. (2013), Greenwood-Vayanos (2014), Musto et al. (2018), Siriwardane (2019), Koijen-Yogo (2020), Gabaix-Koijen (2020), Bretscher et al. (2021), Vayanos-Vila (2021)
- **Real Effects of Bond Markets:** Gilchrist-Zakrajšek (2007), Philippon (2009), Almeida et al. (2011, 2017), Harford-Uysal (2014), Benmelech et al. (2019, 2021), Darmouni et al. (2020), Kundu (2021)
- **Heterogeneous Investors in Equity Markets:** Barberis et al. (2005), Greenwood-Thesmar (2011), Aghion et al. (2013), Derrien et al. (2013), Anton-Polk (2014)
- **Insurance Companies:** Ellul et al. (2011, 2015), Becker-Ivashina (2015), Koijen-Yogo (2015, 2016), Sen (2019), Chodorow-Reich et al. (2020), Barbosa-Ozdagli (2021), Becker et al. (2021), Ge-Weisbach (2021)
- **Mutual Funds:** Coval-Stafford (2007), Frazzini-Lamont (2008), Lou (2012), Feroli et al. (2014), Goldstein et al. (2017), Choi et al. (2021), Jiang et al. (2021), Falato et al. (2021), Haddad et al. (2021), Ma et al. (2021)

Overview of Micro Data and US Institutional Setting



- Insurance data from NAIC, fund data from Morningstar, near-universal coverage
- Other large holders: pension funds, hedge funds, endowments, other foreign investors

Aggregate Credit Spreads: Event Selection



Some Key Empirical Objects: Bond Drawdowns and Insurer Shares

- Start with raw bond returns $R_{i,t}$, bond durations $D_{i,t}$, Treasury returns $R^f_t(D)$
- Hedged returns $R^H_{i,t} = R_{i,t} - R^f_t(D_{i,t})$ cumulate to $\text{CR}^H_{i,t} = \prod_{\tau=t^0_i}^{t}(1 + R^H_{i,\tau})$
- *Drawdowns* measure value loss to trough in event window $\mathcal{T}_e = (t^S_e, \ldots, t^E_e)$:

$$\zeta_{i,e} = \max_{\tau \in \mathcal{T}_e} \left(1 - \frac{\text{CR}^H_{i,\tau}}{\text{CR}^H_{i,t^S_e}} \right)$$

- Will study how drawdowns $\zeta_{i,e}$ are affected by ex-ante *insurer shares*:

$$\phi_{i,t} = \frac{\text{Insurer Holdings}_{i,t}}{\text{Value Outstanding}_{i,t}}$$

Baseline OLS Approach Studies Impact of Investor Base on Price Dynamics

- Regressions over securities i and events e estimate semi-elasticity β:

$$\log \zeta_{i,e} = \alpha + \beta \cdot \underbrace{\phi_{i,t_e^S-12}}_{\text{Insurer Share}} + \text{Interacted Fixed Effects} + \varepsilon_{i,e}$$

- Baseline analysis imposes progressively saturated interacted fixed effects:

$$\text{Event} \times \text{Firm} \times \underbrace{\text{Bond Rating} \times \text{Size} \times \text{Duration} \times \text{Seniority} \times \text{Floating} \times \text{Callable}}_{\text{Security Characteristics}}$$

- Traded prices (TRACE) for universe of *actively traded* investment-grade bonds

Example

US Corporate Bonds Held by Insurers Suffer Less in Market Downturns

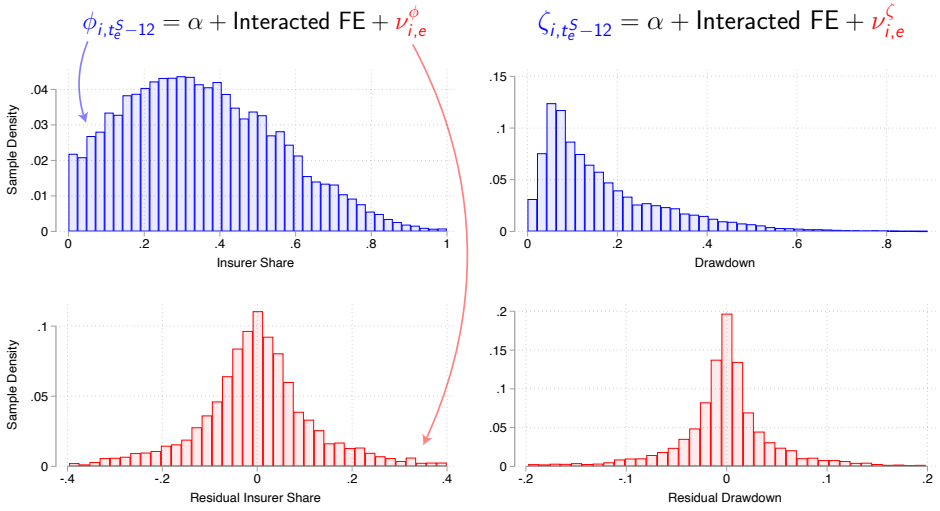
$$\log \zeta_{i,e} = \alpha + \beta \cdot \phi_{i,t_e^S-12} + \text{Interacted FE} + \varepsilon_{i,e}$$

	Log Drawdown				
	(1)	(2)	(3)	(4)	(5)
Insurer Share	-.41**	-.60**	-.47**	-.41**	-.42**
	(.06)	(.05)	(.05)	(.10)	(.10)
Fixed Effects	Event	Event × Size × Duration	Event × Size × Duration × Rating	Event × Size × Drn. × Rtg. × Firm	Full
Identifying Observations	15,012	14,996	14,649	5,328	4,945
Identifying Firms	1,430	1,430	1,412	452	437
R^2	.27	.60	.68	.84	.85

Prices Equilibrium Reversion Arbitrage

SE Clustered by Firm-Event

There Is Sizable Variation Left After Adopting Saturated Specifications



Heterogeneity and Robustness

1. Heterogeneity in estimates
   - By rating group
   - By event
2. Within-sector analysis
3. Further fixed effect interactions:
   - Tighter duration categories
   - Bond age, 144A, covenants
4. Fixed-window drawdowns
5. Full-panel extension
6. Remove return hedging
7. Drop bonds with zero insurer share
8. Drop bonds with trade gaps
9. Exclude AIG holdings
10. Placebos

More in the Paper: Shift-Share IV Approach to Sharpen Identification

- Shift-share approach focusing on *extensive margin* of primary market allocations
  - Identifying variation in IV is a *subset* of that used in OLS approach
- Fairly powerful instrument, results consistent with OLS baseline

Identifying Assumption

The matching between *individual insurers* and *particular bonds* on the primary market is uncorrelated with unobserved determinants of future drawdowns that are not explained by issuer effects and observed bond characteristics

Details Non-US

Understanding the First Stage: Why Is the Instrument Powerful?

1. Large insurers mostly buy bonds on the primary market, trade little afterwards

2. Purchase decisions are idiosyncratic: each insurer buys only a few bonds

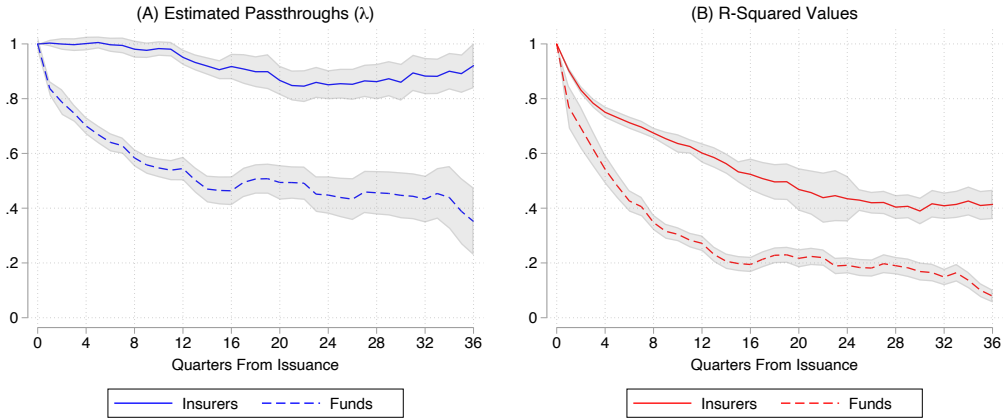
3. Idiosyncrasy matters in aggregate because of deviation from law of large numbers

These same institutional features explain the presence of sizable residual variation

Most Variation in Insurer Ownership Is Determined at Issuance

With $\tau(i)$ issuance date of bond i, estimate quarterly local projections:

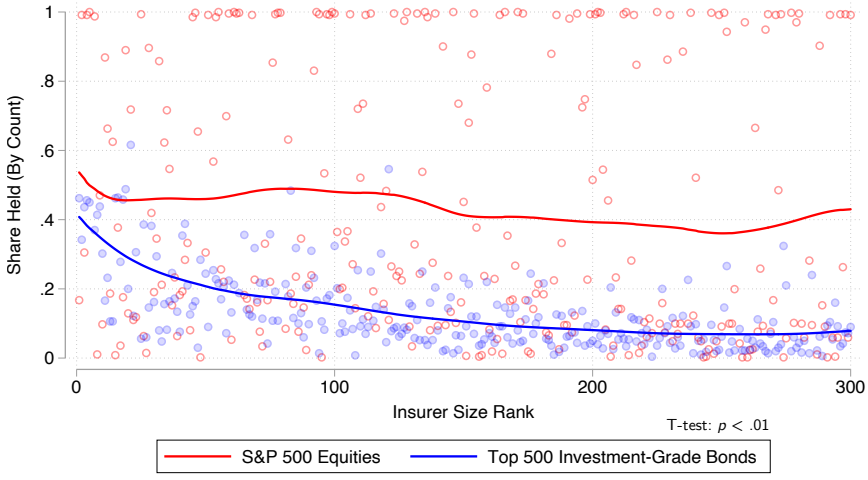
$$\phi_{i,\tau(i)+12\,s} = \alpha_s + \lambda_s\,\phi_{i,\tau(i)} + \varepsilon_{i,s}$$



Trade Sizes | Liquidity | Heterogeneity

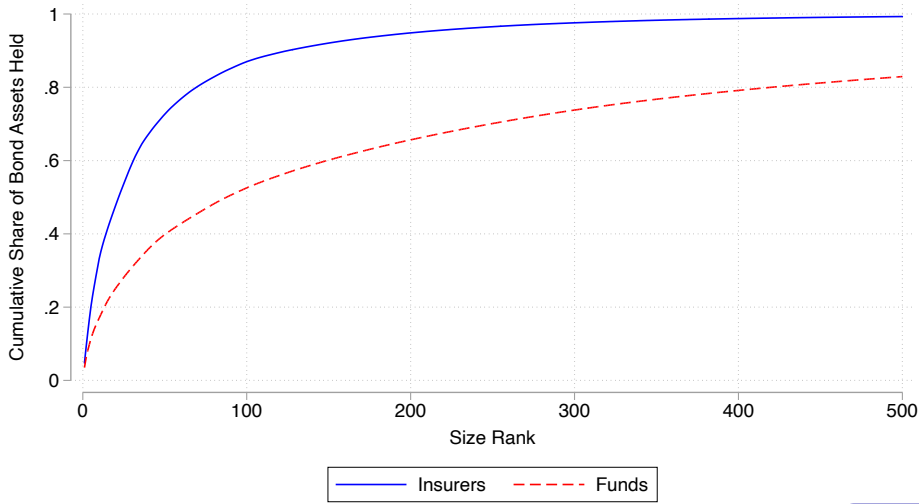
Idiosyncrasy in Insurers' Corporate Bond Holdings at the Security Level

Few insurers hold more than a small fraction of even the most liquid corporate bonds:

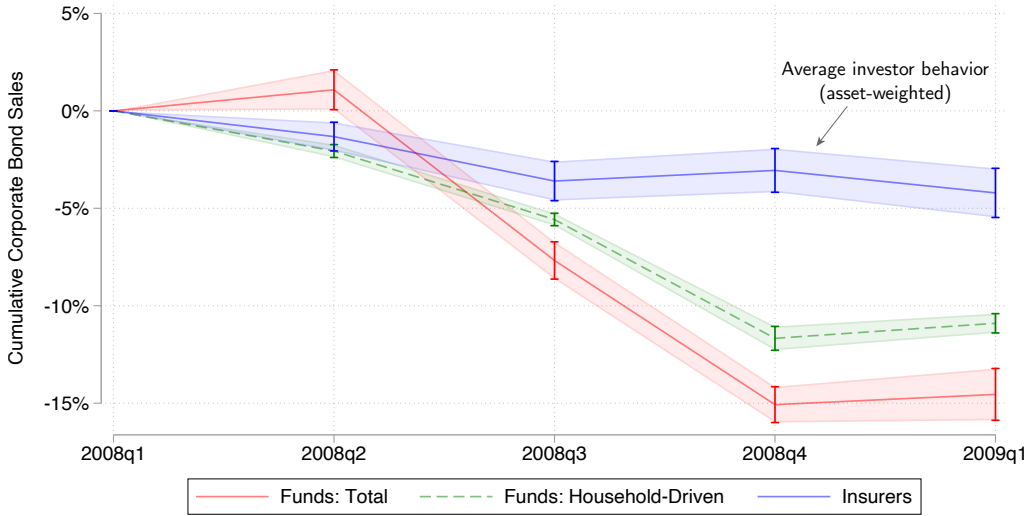


Funds Robustness

The Size Distribution of Insurer Portfolios Is Very Concentrated



Portfolio Mechanism: Funds Sell More, Driven by Client Redemptions



Transactions ETFs

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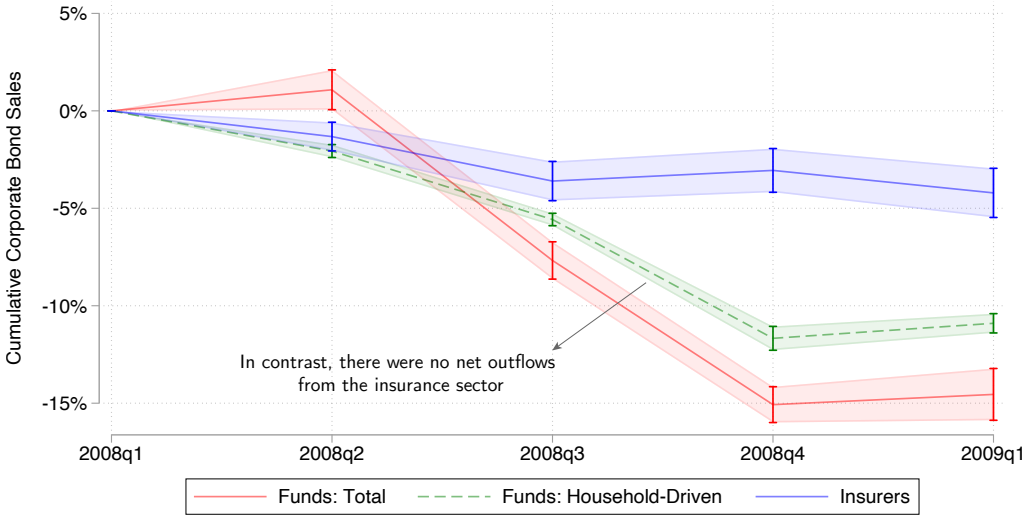


Transactions ETFs

Aggregating to the Firm Level Requires Stronger Assumptions

- Construct firm-level instrument by aggregating across firm's outstanding bonds

Identifying Assumption (Security Level)

The matching between *individual insurers* and *particular bonds* on the primary market is uncorrelated with unobserved determinants of future drawdowns that are not explained by **issuer effects** and **observed bond characteristics**

↓

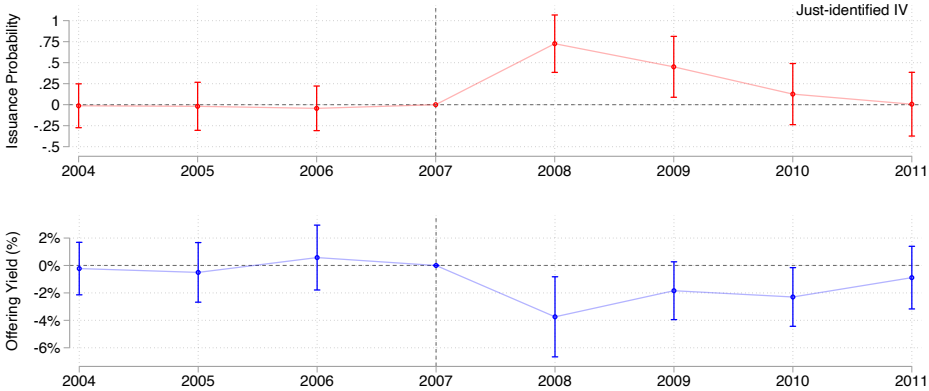
Identifying Assumption (Firm Level)

The matching between *individual insurers* and *particular bonds* on the primary market is uncorrelated with unobserved determinants of real firm outcomes that are not explained by **observed firm attributes** and **average firm-level bond characteristics**

Details

Fire Sales Decrease Issuance Probability and Increase Cost of Capital

$$\underbrace{Y_{k,t}}_{\text{Credit-market outcomes}} = \alpha_k + \gamma_t + \sum_{\tau} \beta_\tau \, \phi_k \, \mathbb{1}_{\tau=t} + \text{Controls} + \varepsilon_{k,t}$$



Firm-level controls: sector, rating, average duration category, size decile, leverage decile (interacted with time dummies)

Secondary Market | Elasticities | Relationships

Macro-Prudential Policy Takeaways: Trading Off Liquidity and Stability

- Different nature of financial intermediation contracts: *open-end* vs. locked-in capital
- Insurers do not contribute to fire sales, but funds engage in more liquidity provision:
  1. Funds more willing to trade in normal times, enhancing securities' *market liquidity*
  2. *Ease of redeemability* valuable as it accommodates households' liquidity demand shocks
- Ideal financial intermediary would provide liquidity in a state-contingent manner
- Tradeoff: how much to incentivize each type of intermediation structure?
  - Possible instruments: tax/subsidize redeemability, "gating" in crises, swing pricing

Conclusion

- Causal evidence for the role of investor composition over the credit cycle
- Ownership by stable, long-term investors (*safe hands*) mitigates value losses
  - In the corporate bond market, important heterogeneity between insurers and funds
  - Effects pervasive across countries, driven by heterogeneous structure of intermediation
- Aggregation results imply transmission to real firm outcomes via financing cutbacks
  - Investor base affects dynamics of investment, bond issuance, cost of capital in crises
- Implications for macro-prudential regulation: tradeoff between stability and liquidity