

MARKET MACROSTRUCTURE INSTITUTIONS AND ASSET PRICES

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UCLA & NBER

NBER Long-Term Asset Management

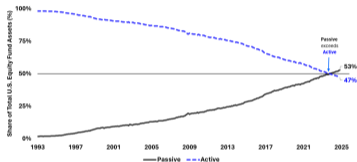
April 18, 2026

Based on “Market Macrostructure: Institutions and Asset Prices”

Annual Review of Financial Economics, 2025

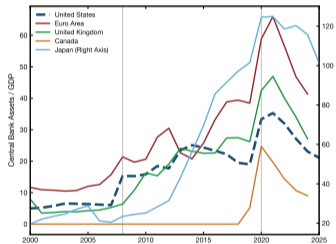
THREE LARGE SHIFTS IN MACROSTRUCTURE

Passive Investing



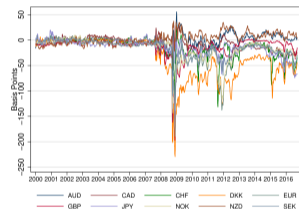
Passive now >50% of equity fund assets

Central Bank QE



CB balance sheets ~40% of GDP

Post-Crisis Regulation



Persistent CIP violations since 2008

Brightman & Harvey (2025), Haddad, Moreira & Muir (2024), Du, Tepper & Verdelhan (2018, *JF*)

NEOCLASSICAL FINANCE VS. MARKET MACROSTRUCTURE

Neoclassical Finance

- **Fed buys \$9T in bonds**
→ *"Nothing happens"*
- **50% passive investing**
→ *"No big deal"*
- **Banks devastated**
→ *"Irrelevant for prices"*

NEOCLASSICAL FINANCE VS. MARKET MACROSTRUCTURE

Neoclassical Finance

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VS

Market Macrostructure

- Fed buys \$9T in bonds
→ **Yields drop 100+ bps**
- 50% passive investing
→ **Markets 20% more inelastic**
- Banks devastated
→ **Risk premia spike**

These institutional shifts move prices by **large, measurable** amounts

WHAT IS MARKET MACROSTRUCTURE?

The broad organization of financial markets into key players and institutional features, and how this affects **the level and dynamics of asset prices**

1. Who

Who are the key players?

2. How

How do they trade?

3. What

How does this shape prices?

4. Counter-factuals?

What changes will impact prices?

WHAT IS MARKET MACROSTRUCTURE?

The broad organization of financial markets into key players and institutional features, and how this affects **the level and dynamics of asset prices**

Bring in as much information as possible!

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PLAN FOR TODAY

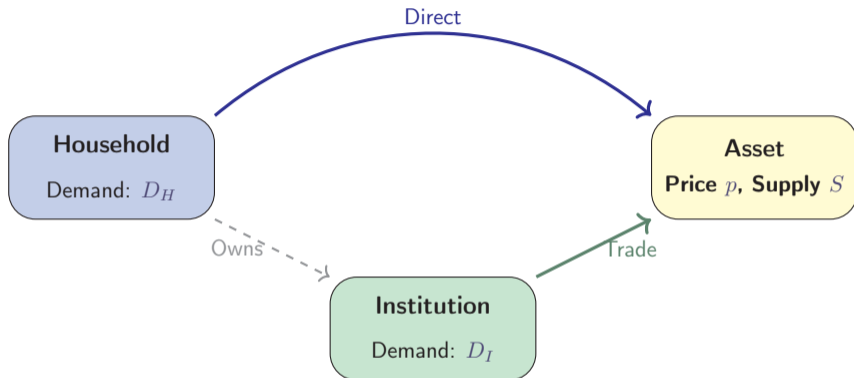
- 1 **The simplest framework:** two conditions for macrostructure to matter
- 2 **Intermediaries and crises:** shocks to balance sheets, regulation, fragility
- 3 **The rise of passive investing:** strategic responses and market elasticity
- 4 **Central banks in asset markets:** policy rules, “whatever it takes”
- 5 **The macrostructure playbook:** how to do this research

OUR APPROACH

“Prefer being approximately right rather than rigorously wrong”

- Not a single model of everything in the world
- Not just case studies. **Common threads** across seemingly disparate settings

THE SIMPLEST MODEL OF MARKET MACROSTRUCTURE



■ **Key:** HH demand depends on institution's holdings: $D_H(p, x_A, x_H, D_I)$

■ **Equilibrium:** $D_I(p, x_A, x_I) + D_H(p, D_I, x_A, x_H) = S$

Framework following Haddad & Muir (2021, *JF*)

WHEN DOES MACROSTRUCTURE MATTER?

Condition 1: Imperfect offset

$$\frac{\partial D_H}{\partial D_I} \neq -1$$

HH don't perfectly undo institution's trades

Trading costs, expertise, inertia, behavioral frictions

+

Condition 2: Institutional shifts

$$\frac{\partial D_I}{\partial x_I} \Delta x_I \neq 0$$

Institution's trading changes

Crises, QE, regulation, passive growth

⇓

Macrostructure affects asset prices

THREE APPROACHES TO QUANTIFICATION

Natural Experiments

Exploit shocks to identify causal effects

Shleifer (1986)

Du, Tepper & Verdelhan (2018)

Muir (2017)

Microfoundations

Specific frictions, rich dynamics

He & Krishnamurthy (2013)

Vayanos & Vila (2021)

Brunnermeier & Sannikov (2014)

Quantities / “Demand”

Flexible, data-driven, rich heterogeneity

Koijen & Yogo (2019)

Gabaix & Koijen (2021)

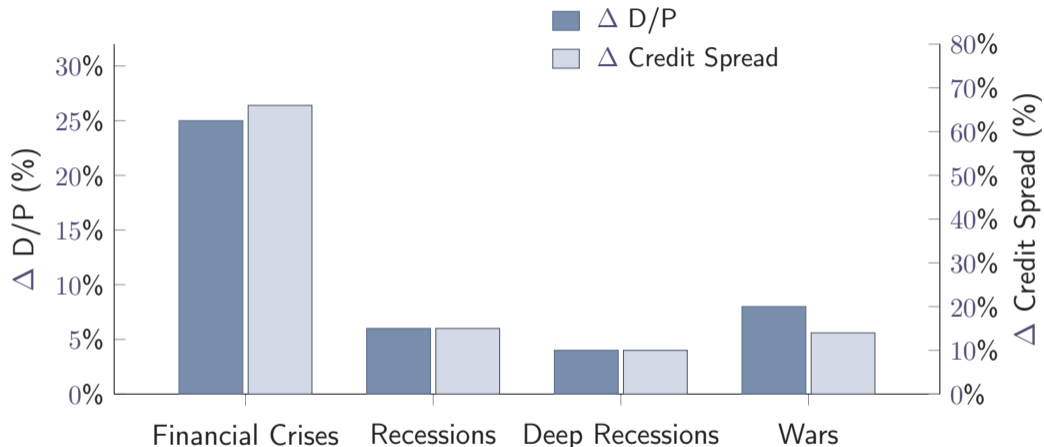
Haddad et al. (2025, 2026)

Somogyi, Wallen & Xu; Davis, Kargar, Li & Silva (this conference!)

Intermediaries and Financial Crises

How shocks to financial institutions affect asset prices

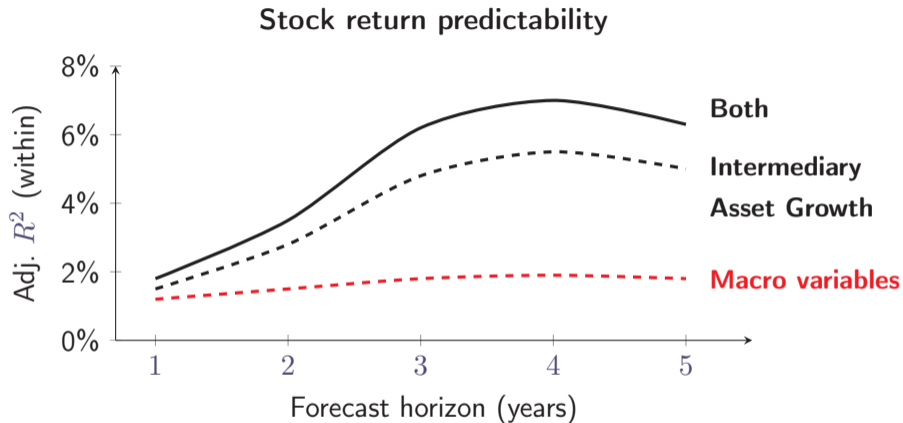
FINANCIAL CRISES AND RISK PREMIA



■ Severe shocks to financial sector spike risk premia, even relative to other macro disasters

Muir (2017, *QJE*), 14 countries, 140 years. See also Wachter (2013)

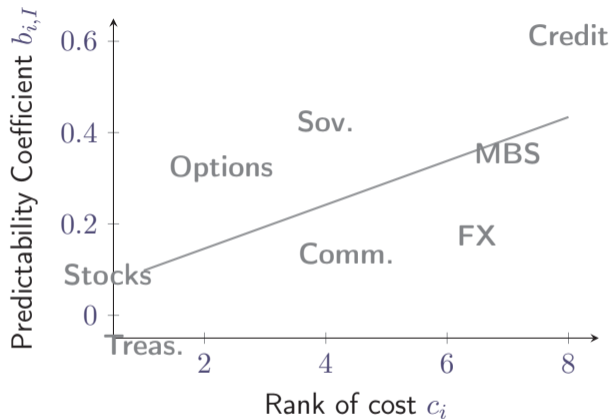
IS THIS ONLY A CRISIS EFFECT? NO.



- Lower-frequency expansion of intermediary sector also compresses risk premia

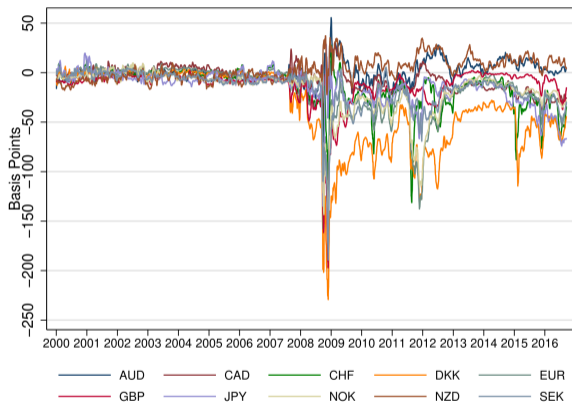
Baron & Muir (2022, *RFS*), international panel since 1870. See also Adrian, Etula & Muir (2014, *JF*), Pflueger, Siriwardane & Sunderam (2020)

EFFECTS STRONGEST FOR HIGHLY INTERMEDIATED ASSETS



- More intermediated asset classes \rightarrow stronger sensitivity to intermediary shocks
- Ranking from: holdings data (FoF, BIS), intermediary VaR (10-K filings), ETF expense ratios

POST-CRISIS REGULATION & CIP: DEALERS STEP BACK



- New capital and leverage rules → persistent mispricings in OTC markets

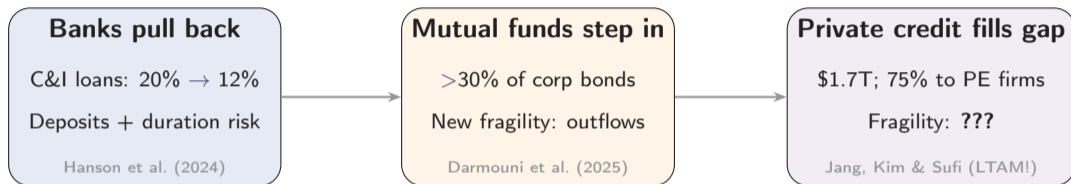
Du, Tepper & Verdelhan (2018, *JF*). See also Duffie (2022), Du & Schreger (2023)

THE PATTERN

1. **Theory** tells us how intermediaries should matter for asset prices vs. standard mechanisms
 2. We **know a lot** about intermediaries:
 - *When* they are in trouble (financial crises, LTCM, 2008, March 2020)
 - *Which assets* they matter for (credit, MBS, derivatives \gg equities, Treasuries)
 - *Which regulations* they face (leverage ratios, risk weights, Volcker rule)
- \Rightarrow **Combine** these to develop a concrete, quantitative understanding of how institutional frictions affect prices

The same approach applies to passive investing and central banks

THE POST-CRISIS TRANSITION: RISE OF NON-BANKS

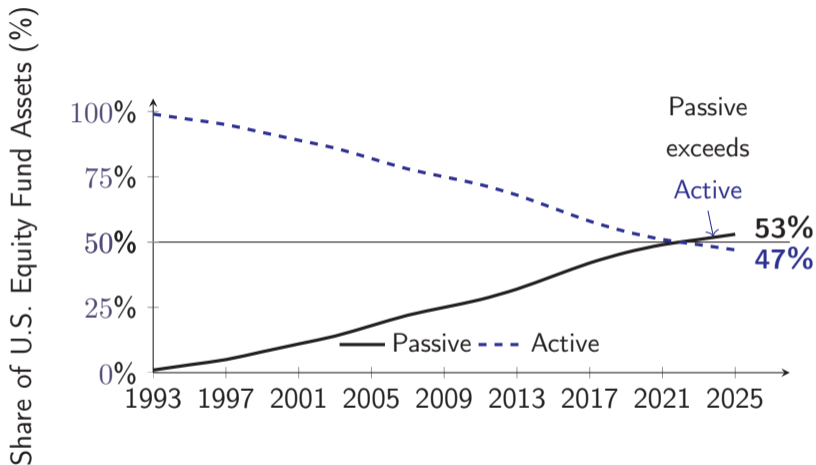


- **Mutual funds:** now hold >30% of corporate bonds (up from <10%)
 - Different fragility: **outflow-driven selling** in 2020 (Darmouni et al. 2025)
- **Outstanding questions about fragility:** \$1.7T private credit market, who holds the risk? **Untested in a downturn.**

The Rise of Passive Investing

Does it matter that 50% of the stock market is passive?

THE RISE OF PASSIVE AND DECLINE OF ACTIVE INVESTING



- Passive share of U.S. equity fund assets: 0% → 53% (crossed 50% in 2024)

THE GROSSMAN-STIGLITZ PARADOX

If nobody is active, who makes prices efficient?

Grossman & Stiglitz (1980): markets can't be efficient *and* have zero active trading

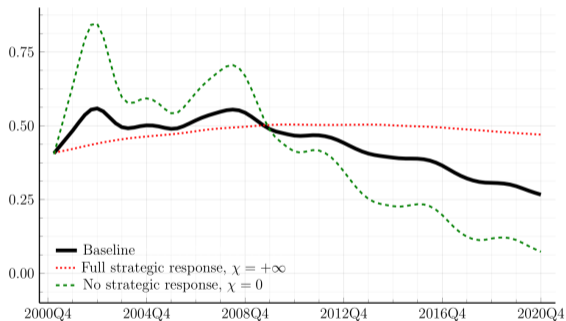
More passive investors



Do the remaining active investors respond to compensate?

MARKETS ARE NOW 20% MORE INELASTIC

- **HHL approach:** direct information from how institutions trade and respond to each other



- Rise of passive \rightarrow markets measurably 20% more inelastic

MANY SOURCES OF INFORMATION AND IMPLICATIONS

■ **Alternative approaches:**

- Trading data (Haddad, Huebner & Loualiche 2025; Koijen, Richmond & Yogo 2024)
- Natural experiments: index inclusions (Ben-David, Franzoni & Moussawi 2018)
- Direct measures of information content (Sammon 2024, Coles et al. 2022)

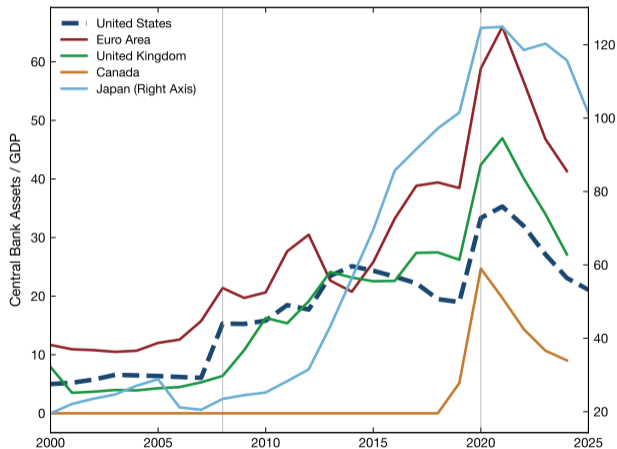
■ **Implications for market stability:** more trading in market index products → higher market volatility (Lochstoer & Muir 2025)

■ **The same path:** specific information about trading → quantification → equilibrium → counterfactual

Central Banks in Asset Markets

How QE and policy promises affect bond prices

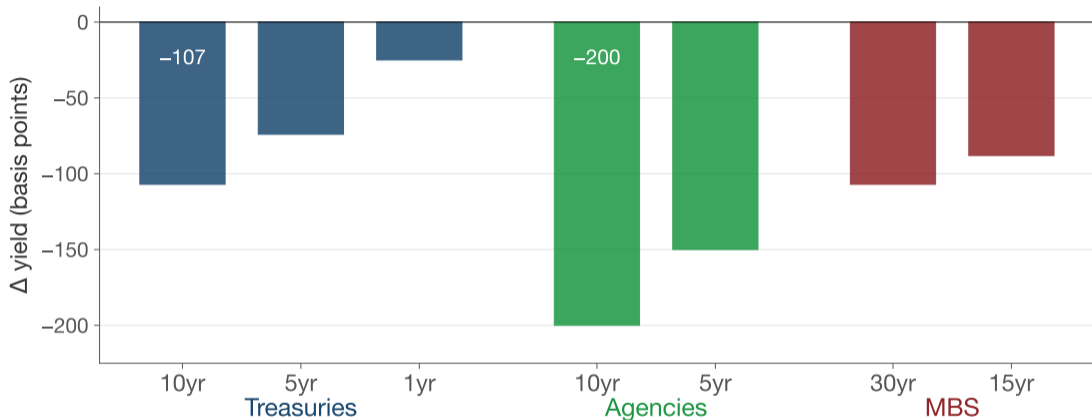
CENTRAL BANKS: THE LARGEST BOND MARKET PLAYER



- A new dominant player enters asset markets
- CB balance sheet $\sim 40\%$ of GDP
- Fed peaked at $\approx \$9$ trillion
- $> \$1$ trillion in weeks (March 2020)
- Not just purchases: **perceived promises** about future actions

Haddad, Moreira & Muir (2024). See also Kotronis, Leombroni, Rogers & Van Der Beck (this conference!)

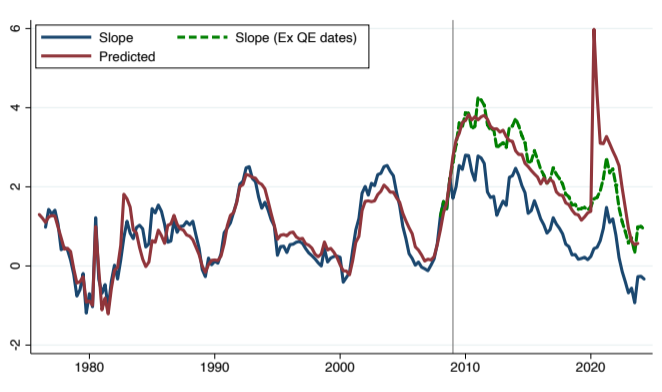
QE ANNOUNCEMENTS MOVE YIELDS 100–150 BPS



- Five QE1 events: **-107 bps** (10yr Treasury), **-200 bps** (10yr Agency)
- Effects are enormous, puzzlingly large from a purely static view, even with frictions

Krishnamurthy & Vissing-Jorgensen (2011). See also Gagnon et al. (2011), Krishnamurthy, Nagel & VJ (2018, ECB), Selgrad (2024)

NOT JUST ANNOUNCEMENT EFFECTS: A PERSISTENT SHIFT



- QE effects are not just short-lived announcement surprises
- A long-term shift in the yield curve, driven by the Fed's ongoing strategy

Haddad, Moreira & Muir (2024)

THE CENTRAL BANK AS A DYNAMIC PLAYER

Fed buys in bad times



**Bonds appreciate in
downturns**



Bonds are safer ex-ante

Higher demand → lower yields
always

QE in crises: 2008, 2020

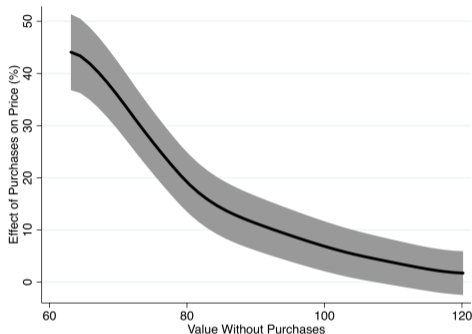
CB purchases raise prices in
bad states

The trading *rule* matters, not just individual purchases

Investors anticipate the strategy → yields lower even when Fed is *not* buying

HMM (2024). See also Jansen, Li & Schmid (2025); Cieslak & Khorrami; Kekre & Lenel (this conference!)

“WHATEVER IT TAKES” MOVES OPTION PRICES



- Options: a **window into views of the future**, inferring state-contingent expectations of CB purchases
- Disproportionate effect on OTM puts: CB provides **downside insurance**

Haddad, Moreira & Muir (2025, *AER*)

ANOTHER PATH: WHAT CENTRAL BANKS AND INVESTORS SAY

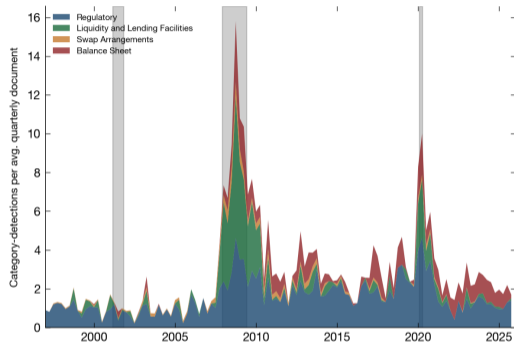
“It is critically important that in our communication we emphasize state contingency.”

Bernanke, FOMC Transcripts

“[We] tactically extended duration. . . as we expect mortgages to continue to respond well to the Fed’s quantitative easing program.”

Mutual fund investor letter, 2009

Listen to what they say: classify >500k documents from Fed and market sources using LLMs
Haddad & Muir (2026), “Everything but the Interest Rate,” coming soon!



Non-rate interventions: near zero before 2008, 3x higher after

Doing Macrostructure Research

THE SAME PLAYBOOK, THREE TIMES

- **Crises:** we *know* when intermediaries are in trouble (2008, March 2020; regulation)
 - risk premia spike, strongest in intermediated assets
- **Passive:** we *know* which funds are passive (index/ETF)
 - isolate truly price-insensitive demand; markets 20% more inelastic
- **Central banks:** they *tell us* what they'll do (announcements, transcripts, disclosures)
 - trace effects on yields and term premia

Exploit institutional information, with theory as a guidelight of what matters and how.

THE MACROSTRUCTURE WORKFLOW

1. **Theory:** which institutions should matter, and why
2. **Holdings and prices:** who owns what (FoF, 13F, regulatory filings)
3. **Strategies:** exploit outside information — condition, rules, mandates, communications
4. **Quantify and validate:** counterfactuals, natural experiments, crises

FURTHER OPEN QUESTIONS

- **Cross-country differences in macrostructure:** causes and consequences?
 - China retail-heavy, Scandinavia pension-heavy, U.S. intermediary-heavy
- **Private credit:** who holds the risk, and what happens in a downturn?
 - new \$1.7T market; [Jang, Kim & Sufi \(this conference!\)](#)
- **Pensions demand and portfolio changes:** what does it imply for asset prices?
 - Greenwood-Vissing Jorgensen, Scharfstein (2018), 60% → 20% equity, Gilt crisis shock
- **Sovereign wealth funds:** objective functions and weight in markets?
 - geoeconomic role, Zhang and Zhou (2026)
 - ▶

Market Macrostructure

The broad organization of financial markets into key players and institutional features, and how this affects **the level and dynamics of asset prices.**

These are **first-order forces** in financial markets.

A common framework connects these phenomena. Much remains to be understood.

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Paper: *Annual Review of Financial Economics*, 2025

Resources for researchers and students:

marketmacrostructure.com (under construction)



REFERENCES: PAPERS ON THIS CONFERENCE PROGRAM

- Davis, Kargar, Li & Silva — “On the Recovery and Usage of Demand Elasticities in Dynamic Settings” (LTAM)
- Kotronis, Leombroni, Rogers & Van Der Beck — “When the Tide Goes Out: The Effect of QE on the Structure of the Financial System” (LTAM)
- Jang, Kim & Sufi — “Private Credit at Scale: Evidence from US Regulatory Data” (LTAM)
- Calvet, Celerier, Liao & Vallee — “How do Households Suppress the Price of Tail Risk?” (AP)
- Somogyi, Wallen & Xu — “What Treasury Auctions Reveal About Investor Demand” (AP)
- Cieslak & Khorrami — “Monetary Shocks and Long-Run Neutrality in Asset Pricing” (AP)
- Kekre & Lenel — “A Model of U.S. Monetary Policy and the Global Financial Cycle” (AP)

REFERENCES: OWN WORK DISCUSSED

- Haddad & Muir (2021), "Do Intermediaries Matter for Aggregate Asset Prices?" *JF*
- Muir (2017), "Financial Crises and Risk Premia," *QJE*
- Baron & Muir (2022), "Intermediaries and Asset Prices: International Evidence Since 1870," *RFS*
- Adrian, Etula & Muir (2014), "Financial Intermediaries and the Cross-Section of Asset Returns," *JF*
- Haddad, Huebner & Muir (2021), "When Selling Becomes Viral," *RFS*
- Haddad, Moreira & Muir (2024), "Asset Purchase Rules: How QE Transformed the Bond Market"
- Haddad, Moreira & Muir (2025), "Whatever It Takes? The Impact of Conditional Policy Promises," *AER*
- Haddad, Huebner & Loualiche (2024), "How Competitive Is the Stock Market?"
- Haddad & Muir (2026), "Everything but the Interest Rate: Measuring Central Bank Interventions"
- Haddad, He, Huebner, Kondor & Loualiche (2026), "Causal Inference for Asset Pricing"
- Lochstoer & Muir (2025), "Market Volatility and Expectations"

REFERENCES: KEY LITERATURE

Microfoundations

- Campbell & Cochrane (1999, *JPE*)
- Vayanos & Vila (2021, *Econometrica*)
- He & Krishnamurthy (2013, *AER*)
- Brunnermeier & Sannikov (2014, *AER*)
- Greenwood & Vayanos (2014, *RFS*)
- Adrian & Shin (2014)
- Gabaix & Maggiori (2015, *QJE*)

Demand Estimation

- Kojien & Yogo (2019, *JPE*)
- Gabaix & Kojien (2021)
- Haddad et al. (2025, 2026)
- Bretscher, Schmid, Sen & Sharma (2022)
- Jansen, Li & Schmid (2024)
- Chaudhary, Fu & Zhou (2024)

Natural Experiments & Evidence

- Du, Tepper & Verdelhan (2018, *JF*)
- Krishnamurthy & Vissing-Jorgensen (2011)
- Greenwood & Vissing-Jorgensen (2018)
- Shleifer (1986)
- Duffie (2022)
- Chinco & Sammon (2024, *JFE*)
- Nagel, He & Song (2022)

Broader Applications

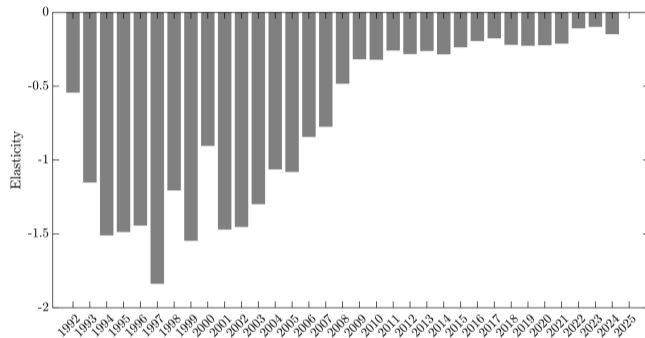
- Pflueger, Siriwardane & Sunderam (2020)
- Ma, Xiao & Zeng (2022, *RFS*)
- Pástor, Stambaugh & Taylor (2021, *JFE*)
- Hanson, Ivashina, Stein et al. (2024)
- Scharfstein (2018, *JF*)
- Wachter (2013)
- Rostek & Weretka (2015)

STRATEGIC RESPONSE MODEL (HHL 2024)

	Individual Decision	Equilibrium
Competition for asset	$d_i = \bar{d}_i - \mathcal{E}_i \times (p - \bar{p})$	$\int_i D_i(p) = S$
Competition in strategies	$\mathcal{E}_i = \bar{\mathcal{E}}_i - \chi \times \mathcal{E}_{agg}$	$\int_i \mathcal{E}_i D_i / S = \mathcal{E}_{agg}$

- **Key parameter χ :** degree of strategic response
 - $\chi = 0$: no response; $\chi \rightarrow \infty$: perfectly competitive
- **Empirical estimate:** $\chi = 2$ from cross-section of stocks
- **Result:** 30% increase in passive \Rightarrow markets 12.5% less elastic

SOMOGYI, WALLEN & XU: TREASURY DEMAND ELASTICITY



- Treasury auction demand $\sim 5x$ more inelastic since 2010

CIESLAK & KHORRAMI: MONETARY SHOCKS AND ASSET PRICES



- Violations of long-run neutrality during unconventional monetary policy

WHY IS THE OFFSET IMPERFECT?

In every market, a **large share** of investors barely respond to prices. A **small set** of active institutions set prices at the margin.

Market	Inactive investors	Why they don't adjust
Equities	Index funds, closet indexers, retail	Track benchmark; no price signal
Bonds / credit	Pensions, life insurers, CLOs	Liability matching; mandates
Treasuries	Foreign CBs, reserves managers	Policy objectives, not returns
FX	Corporate hedgers, sovereign funds	Hedging real exposures
Options	Retail structured product buyers	Yield-seeking; ignore tail risk

A large mass of **inactive** demand + a thin layer of **active** price-setters

⇒ shocks to either side move equilibrium prices by large amounts

BEING GUIDED BY THEORY

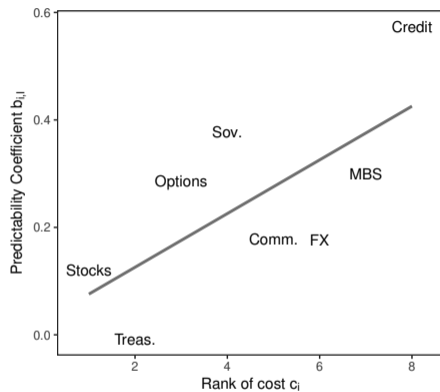
- **Moral hazard:** constraints bind in crises → fire sales He & Krishnamurthy (2013)
- **Endogenous risk:** calm times breed fragility Brunnermeier & Sannikov (2014)
- **Preferred habitat:** supply shocks move the yield curve Vayanos & Vila (2021)

Theory tells us *what to look for*. Information about actual trading tells us *where to look*

See also Adrian & Shin (2014), Gabaix & Maggiori (2015, *QJE*), Greenwood & Vayanos (2014, *RFS*)

◀ Back

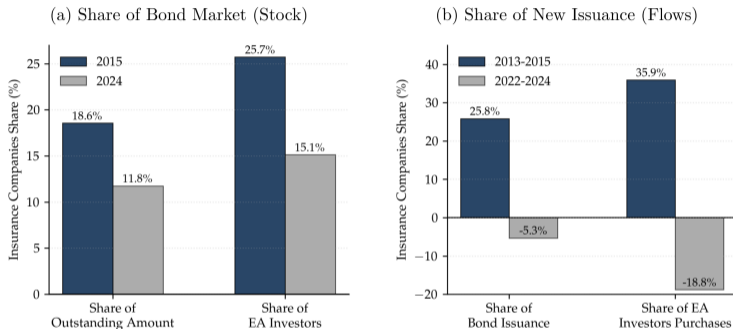
HADDAD & MUIR (2021): CROSS-ASSET INTERMEDIATION



- More intermediated asset classes \rightarrow stronger sensitivity to intermediary shocks

QE RESHAPES WHO HOLDS BONDS

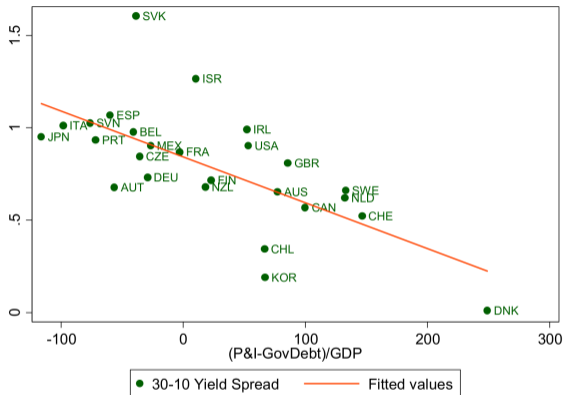
Figure 1: Insurance Companies, Shares of Bond Market



- QE compressed term premia → insurance bond market share: 19% → 12%
- Effects **not symmetric** during QT

Kotronis, Leombroni, Rogers & Van Der Beck (this conference!). See also Sen (2023), Koijen & Yogo (2022)

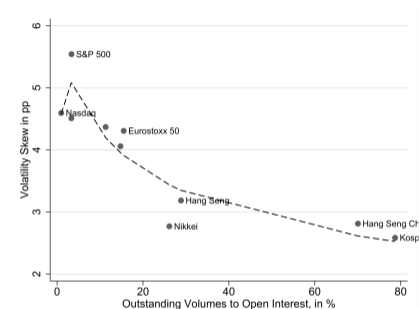
PENSIONS SHAPE THE YIELD CURVE



- Countries with large pension/insurance sectors → lower long-term yields

Greenwood & Vissing-Jorgensen (2018). See also Scharfstein (2018, *JF*), Hanson, Ivashina, Stein et al. (2024)

CALVET ET AL.: HOUSEHOLDS SUPPRESS TAIL RISK



- HH sell OTM puts via structured products; where volumes large, vol skew compressed 2–5pp
- South Korea bans SPPs \Rightarrow implied vol rises 3+ pp — the playbook in action

Calvet, Celerier, Liao & Vallee (this conference!)