Corporate Bond Multipliers: Substitutes Matter

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This Paper

Understanding the demand curve of bonds

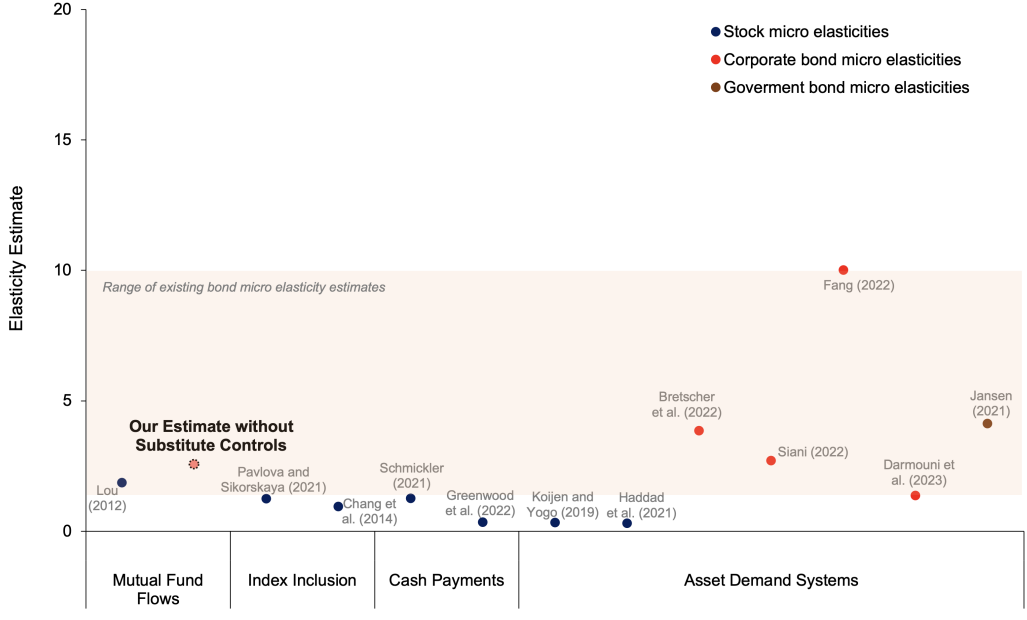
- Estimate bond elasticities:

$$q_{it} = \Gamma_i p_{it} + u_{it}$$

Lots of work on the topic

- Demand elasticities for financial assets are low in the data (lower than traditional models)

This Paper


Stock micro elasticities
Corporate bond micro elasticities
Goverment bond micro elasticities
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15
10
5
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Range of existing bond micro elasticity estimates
Our Estimate without Substitute Controls
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Mutual Fund Flows
Index Inclusion
Cash Payments
Asset Demand Systems

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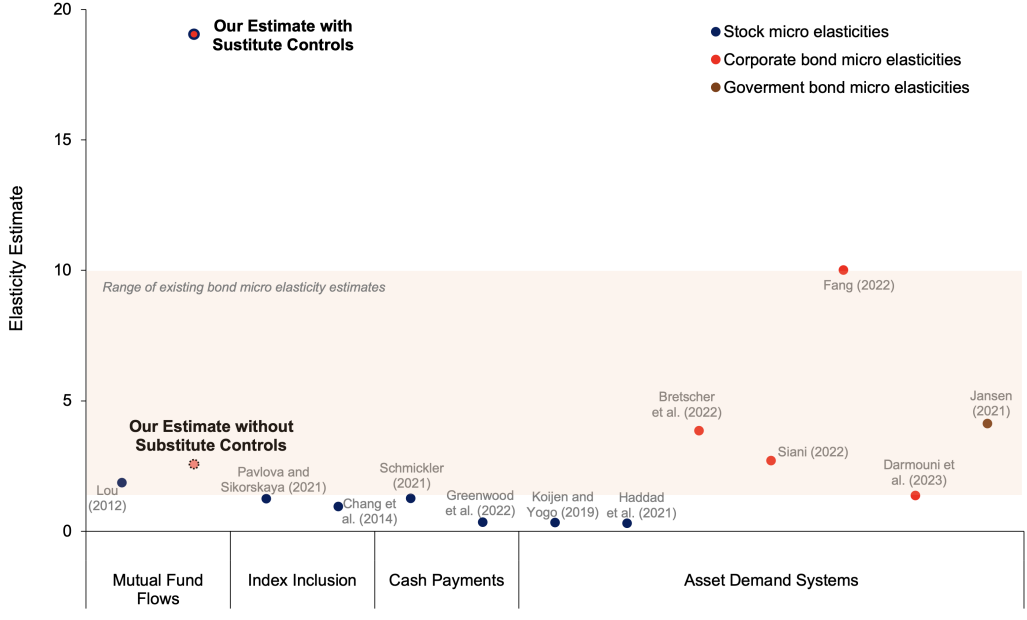
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This Paper

What is new in this paper

- Account for substitution across assets
- If the price of Alice's bond goes up,
  - I will not buy Zoe's bond but I will be happy to buy Alicia's bond
- Estimate demand system with substitution

$$q_{it} = \Gamma_i p_{it} + \Gamma_{ij} p_{jt}^{\text{substitutes}} + u_{it}$$

- Reevaluate price-demand elasticities accounting for substitution patterns
  - Intuition: introduce a substitute then I will respond to prices: higher elasticity
  - Result: introducing a substitute empirically leads to a higher estimated elasticity

This Discussion

- Quick summary: How do they do it?
- How does this move the demand-based framework?
- Why it is important, and what to do next?

Plan

How do they do it?

- Corporate bonds are uniform products beyond observable characteristics (maturity, ratings)
- Construct two instruments
  - 1. Effect of exogenous demand for a given bond on its price
  - 2. Effect of exogenous demand to close substitutes (and their price) on the bond price

$$\Delta p_{i,t} = \Gamma_i u_{i,t} + \Gamma_{ij} u_{j,t}^{\text{substitute}}$$

- Own-price instrument $\hat{u}_{i,t}$: price pressure from funds flows conditional on holding shares
- Close substitutes price instrument $\hat{u}_{j,t}$: price pressure from funds flows conditional on holding shares

The demand framework: Koijen-Yogo

Benchmark framework: Koijen-Yogo

- Koijen-Yogo (2019): logit model in portfolio shares for asset i and investor k

$$\log \omega_{i,k} = -\gamma_{i,k} p_i + \boldsymbol{\beta}_{i,k}^T \mathbf{X}_{i,k} + \varepsilon_{i,k}$$

- Logit model account for substitution effects: $\partial w_{i,k}/\partial p_j \neq 0$
  - Satisfies IIA at investor level: McFadden Red Bus/Blue Bus problem
  - Does not need to satisfy IIA at aggregate level: rich substitution patterns

$$\frac{\partial \boldsymbol{q}_t}{\partial \boldsymbol{p}_t'} = \boldsymbol{I} - \sum_k \gamma_k \mathsf{AUM}_k \boldsymbol{G}_k$$

The demand framework: This paper

Almost Ideal Demand System

- Instead of starting from logit model of demand: expenditures follow AIDS model

$$\log\left(c(u,p)\right) = \frac{1}{2}\sum_{ij}\gamma_{ij}p_i p_j + \sum \alpha_i p_i + \cdots$$

- Leads to a very simple demand system:

$$\log \omega_i = -\gamma_i p_i + \sum_{j \neq i} \gamma_{ij} p_j + \cdots$$

  - Elasticities of substitution are built-in $\partial \omega_i / \partial p_j = \gamma_{ij}$

The demand framework: This paper

Almost Ideal Demand System

$$\log \omega_i = -\gamma_i p_i + \sum_{j \neq i} \gamma_{ij} p_j + \cdots$$

What are the issues of this demand system

- a. Dimensionality of estimation: based on assets, not on characteristics (similar to covariance estimation)
- b. Aggregate model of demand: different investors will have the same demand curve

What are the solutions?

- a. Reduce dimension by estimating demand for characteristics (3 rating categories, and 3 maturities)
- b. Only an issue for some counterfactuals
  - What is the cross-elasticity of SVB from 30yr to 10yr?
  - Is it the same as JPMorgan same cross-elasticity?

How do they do it?

Simplified demand framework

- Only two substitutes: close and far (~ market)

$$\log \omega_i = -\gamma_i p_i + \gamma_{i,\text{sub}} p_{\text{sub}} + \varepsilon_i$$

- We need to sources of variation for own price p_i and substitute price p_{sub}

Exogenous variation in price: intuition

- Dollar flows in bond funds flows into individual bonds following predetermined shares (mechanical rule)
- These mechanical flows are independent across bonds: $u_i \perp u_{\text{substitute}}$

Threats to identification

Unobserved factors

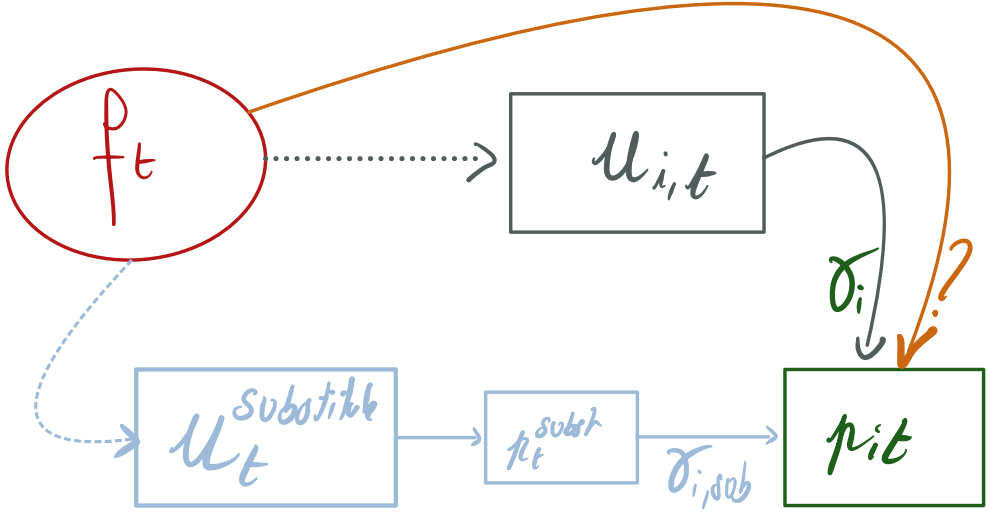
- Flows into bond k follows unobserved factor f_t and are proportional to $\theta_k f_t$
- The price of bond i respond to unobserved factor proportionally to $\beta_i^f f_t$
- Is correlation of flows to prices a measure demand response or a measure of unobserved correlation

$$\operatorname{cov}(\log \omega_i, p_i) = -\gamma_i \sigma_i + \sum_k \beta_i \theta_k$$

Two sources of variation

- *Unobservables:* flows into asset i and its substitute will covary based on the unobserved factor
- *Selection:* Strong assumption that bond flows translate into mechanical allocation into their previous holdings

Threats to identification



Threats to identification

Potential solutions

- *Index inclusion*

Why is this paper important

A big step towards a "full equilibrium"

- Substitution is important for counterfactuals
- Lots of the interesting questions revolve around

  What would happen if investor A was forced to divest or dump asset X but still allowed to hold asset Y

Next steps

- Investor segmentation is particularly relevant in the bond market
  - How to account for investor heterogeneity in the present framework

Some advice for the broader demand-based asset pricing

- Challenge for demand-based asset pricing to not become too self-referential.
- New approach to asset pricing means we are able to ask new questions
  - e.g. this paper relates low elasticity has implications to Sharpe ratio and arbitrage
- What are other questions (counterfactuals) to ask once we have done all this work?

Final Thoughts

Interesting Paper! Go read it.

Take away

- Accounting for substitution effects in demand for bonds adjusts the demand elasticity
- Not as small as we thought?