Intermediary market power and capital constraints

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Intermediary-based asset pricing

- Asset prices $= f(\text{Cov}(\text{asset return, SDF}))$
- Intermediary-based asset pricing:
  - Intermediary's SDF matters.
  - Intermediary's SDF is different from households / representative agent.
- Why might intermediary's SDF be different?
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- This paper: considers the joint dynamic of constraint and market power in the context of Canadian treasury auctions.

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Auctions

- Neat setting:
  - Dealers submit demand schedules.
  - Well-developed machinery to back out WTP for wide range of auction formats.
- Specific set-up (simplest version):
  - N *identical* dealers bidding in a *uniform-pricing*, *multi-unit* auction.
  - Common distribution for value of asset: $R \sim N(\mu, \sigma)$.
  - Dealers have no private information, submit demand schedules.
  - CARA preference with regulatory constraint: $\kappa \leq \frac{E}{p(a+z)}$.
    - p: price; $a_i = a$: amount i purchased from auction; $z_i = z$: existing inventory.
    - κ: regulatory threshold; E: equity.

Results

- Dealer's demand: $a_i(p) = a(p) = (\frac{N-2}{N-1})\frac{1}{\rho\sigma}(\mu - \rho\sigma z - (1 + \lambda\kappa)p)$.
  - ρ: risk aversion, λ: shadow price of regulatory constraint.
- Key insight 1: when constraint relaxes, $\lambda\kappa$ decreases and demands more at p.

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- Re-write demand: $a_i(p) = \left(\underbrace{\frac{\mu - \rho\sigma z}{1+\lambda\kappa}}_{\substack{\text{constraint-adj} \\ \text{utility}}} - p \right) \cdot \underbrace{\frac{1}{N-1}}_{\text{quantity}} \cdot \underbrace{\frac{1}{\Lambda}}_{\text{price impact}}$
  - $\boldsymbol{\Lambda = \frac{\sigma\rho}{N-2}\frac{1}{1+\lambda\kappa}}$; Kyle's lambda.
- Key insight 2: when constraint goes down, price impact goes up.

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- Key insight 2: when constraint goes down, price impact goes up.
- Empirical exercises:
  - Reduced form evidence that slope of demand changes when constraint relaxes (Treasury excluded from regulation during Covid).
  - Structural estimation of ρ, $\lambda\kappa$, and then back out implied Λ.

Intuitions

- Punchline: less constraint leads to lower price but also more market power.
  - Lower prices because each dealer is "wealthier".
  - More market power because everyone bids more so each dealer faces a steeper residual supply curve and consequently has larger price impact.
- Market power == price impact == Kyle's lambda.
  - Kyle (1989): informed traders restrict monopolistically the quanitites they trade to avoid information being compounded in price right away.
- As in Kyle (1989): market power comes from trading against a *sloped* residual supply curve.
- However, in Kyle (1989), informed traders face sloped residual supply curve because they *invested* in acquiring private information.
- No private information here. So what are the sources of market power?

Discussion plan: sources of market power

- $\boldsymbol{\Lambda = \frac{\sigma\rho}{N-2}\frac{1}{1+\lambda\kappa}}$.
- Three sources of "market power":
  - Risk aversion and volatility in return.
  - Small N.
  - Auction / information asymmetry.
- *Q: what drives the trade-off between constraint and market power, and can it be generalize beyond Canadian Treasury auction?*

Source 1: risk aversion and volatility

- $\boldsymbol{\Lambda = \frac{\sigma\rho}{N-2}\frac{1}{1+\lambda\kappa}}$.
- Kyle (1989): Λ is function of informed trader's private information.
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- $\frac{\partial\Lambda}{\partial\lambda\kappa} < 0$.
  - But what about $\frac{\partial\sigma}{\partial\lambda\kappa}$?
- Du, Hébert, and Huber (2022) show that regulatory constraint is an important factor in intermediary's SDF.
  - Distinct from wealth and *can* bind separately from equity constraint.
  - The risk that this constraint tightens is priced across assets.
  - Innovation to constraints contributes significantly to the volatility of the SDF.
- $\Rightarrow$ If $\lambda\kappa$ is relaxed due to policy shift, σ could also decrease, shrinking Λ.
- *Q: can we assume that* $\frac{\partial\Lambda}{\partial\lambda\kappa} = \frac{d\Lambda}{d\lambda\kappa}$ *and conclude that* $\uparrow \lambda\kappa \longrightarrow \uparrow \Lambda$*?*

Source 2: small N

- $\boldsymbol{\Lambda = \frac{\sigma\rho}{N-2}\frac{1}{1+\lambda\kappa}}$.
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- Current estimates: 100% increase in the shadow cost of the capital constraint lowers markup in Canadian Treasury auction by 1 bp.
- Canada: N = 8 primary dealers.
- US: N = 25 primary dealers.
- UK: N = 17 Gilt-edged Market Makers (GEMMs).
- *Q: is price shading a uniquely important question to Canada?*

Source 3: auction / information asymmetry

- Auctions are generically uncompetitive: bidders have private information.
- Dealers in other markets also have market power, but not owing to information asymmetry and don't compete via auctions.
- Triparty repo (Huber (2022)).
  - Market power stems from cash lenders' aversion to portfolio concentration, making cash lenders inelastic to dealers' price.
  - Market power does not meaningfully interact with constraint.
- Foreign exchange (Wallen (2020))
  - Market power occurs on quarter-ends when regulatory constraint makes many dealers inactive.
  - Market power *stems from* constraint.
- *Q: what kind of markets features trade-off between constraint and market power?*

Conclusion

- Constraint and market power are two defining features of the intermediary SDF, so important to understand their interaction.
- Cool application of insights from Kyle (1989) and machinery from auction.
- Because Kyle (1989) was designed to answer a very different question, worth asking: what are the sources of price impact in the current setting?
  - What drives the trade-off between constraint and market power, and can it be generalize beyond Canadian Treasury auction?
- Good luck!

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