Discussion:
Endogenous Specialization and Dealer Networks

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What Is This Paper About?

A search-based framework of OTC asset markets

- Underlying heterogeneity: rate of change of taste for asset for customers
- Dealer network
  - Core-periphery dealer
  - Intermediation
Nice model: search is a useful trick to model frictions in OTC markets

1. Overview of the model
2. Relation to other work
3. Broader perspective: heterogeneity
4. Model implications
Overview of the Model

- Continuous time, infinite horizon model
- Single asset with flow utility \((\delta, \delta - x)\) when \((h, l)\)
  - Asymmetry between \(h\) and \(l\)
- Agents
  - 3 ex-ante homogeneous dealers
  - Continuum of customers with heterogeneous rate of change in flow value, intensity \(k\)
- Each customer picks one dealer to buy from when \(h\) and sell to when \(l\)
  - Buyer, seller, happy owner
- Matching technology
  - Single dealer: \(\lambda_D \rightarrow \lambda_D \mu^s_i \mu^b_i\)
  - Inter dealer: \(\lambda_{DD} \rightarrow \lambda_{DD} \left[ \mu^s_i \left( \sum_j \mu^b_j \right) + \left( \sum_j \mu^s_j \right) \mu^b_i \right]\)
- Bargaining: \(z_D, z_{DD}\) customer share
Symmetric Equilibrium

- All 3 dealers symmetric in measures of their customers in different states
Equilibria

- Symmetric Equilibrium
  - All 3 dealers symmetric in measures of their customers in different states

- Asymmetric equilibrium
  1. Single active-dealer
  2. All dealers active: $\lambda_{DD}z_{DD} > \lambda_Dz_D$
Specialization

Core versus peripheral dealer

- Core dealers specialize in customers who trade often: \textit{liquidity investors}
- Peripheral dealers specialize in customers who don’t: \textit{buy-and-hold investors}

Peripheral customers: lower value for lower price

- Lower option value of search
- At a lower price

Why do liquidity customers get a better value (at a higher price)?

Assumption. Intermediated trades lead to higher expected share: \( \lambda_{DD} z_{DD} > \lambda_{D} z_{D} \)

Endogenous. Intermediated trades more valuable

Farboodi, Jarosch, Shimer (2016)
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Why do liquidity customers get a *better value* (at a higher price)?

- **Assumption.** Intermediated trades lead to higher expected share: \( \lambda_{DD} z_{DD} > \lambda_D z_D \)
- **Endogenous.** Intermediated trades more valuable
- Farboodi, Jarosch, Shimer (2016)
Efficiency

- Symmetric equilibrium inefficient
- Asymmetric equilibrium inefficient as well
  - Liquidity (core) dealer too large
  - Atkeson, Eisfeldt, Weill (2015)
    - Too much entry to intermediation sector and too little entry to customer sector
Ex-ante dealer heterogeneity

- Atkeson, Eisfeldt, Weill (2015)
  - Dealers heterogeneous in exposure to aggregate risk
  - Agents with average exposure intermediate

- Chang and Zhang (2016)
  - Dealers heterogeneous in taste volatility
  - Agents with lower volatility intermediate
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How does this paper related to them?
- Micro-found heterogeneity among dealers using customer heterogeneity
**Literature: Ex-post Dealer Heterogeneity**

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- **Others**
  - Artem’s jmp, Uslu (2016) jmp
    - Ex-ante heterogeneity in meeting rate: fast agents intermediate
  - Hugonnier, Lester, Weill (2016)
    - Agent with close-to-average taste intermediate
Some ex-ante heterogeneity, no ex-ante designated dealers

- My jmp!
- Rent-seeking versus counterparty risk
- *Wrong* intermediators

No ex-ante heterogeneity at all

- Wang (2016) jmp
- Trade-off: competition among core dealers to give favorable quotes versus ability to offset inventory and avoid cost
- Periphery *too-connected* to the core
- Relation to this paper: $\lambda_{DD}z_{DD} > \lambda_Dz_D$
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- **Common theme in all search-based models**
  - Agents with *moderate* taste are central dealers
  - How to generate moderate taste?
Where Does the Heterogeneity come from?
Farboodi, Jarosch, Shimer (2016)

- Plain-vanilla DGP (Eca’05), with a twist!
- Measure one of risk-neutral investors, discount rate $r \to 0$
- Two preference states, $\{l, h\}$
  - Switch at homogeneous, exogenous rate $\gamma > 0$
- A single type of asset, supply $\frac{1}{2}$
  - Asset holding restricted to $\{0, 1\}$
  - Trading opportunities at endogenous rate $\lambda$
- Twist! $\lambda$ chosen irrevocably at time 0, cost $c(\lambda)$ per meeting
  - $G(\lambda)$: population distribution of $\lambda$
  - $\Lambda$: average contact rate
- Payoffs
  - Well-aligned $(h, 1), (l, 0)$: higher average flow payoff
  - Misaligned $(h, 0), (l, 1)$: lower average flow payoff
  - (symmetric) Nash bargaining
Proposition

Pattern of Trade given $G(\lambda)$: core-periphery with fast agents at the core

Proposition

Assume $c(\lambda)$ is continuously differentiable. Then the equilibrium distribution of search efficiency $G(\lambda)$ has no mass points, except possibly at $\lambda = 0$.

Proposition

Assume $\lambda c(\lambda)$ is weakly convex. Then the equilibrium distribution of search efficiency $G(\lambda)$ has a convex support. Moreover, if there are middlemen ($\Lambda > \int_0^\infty \lambda dG(\lambda)$), the support of $G(\lambda)$ is unbounded above.

Proposition

Assume $\lambda c(\lambda)$ is weakly convex and continuously differentiable. Then the equilibrium misalignment rate $m(\lambda)$ is strictly increasing on the support of $G(\lambda)$. 
**Results. Linear Cost Function**

**Proposition**
Assume $c(\lambda) = c$. If $c \geq \Delta/16\gamma$, $\Lambda = 0$ in equilibrium; while if $c < \Delta/16\gamma$, the equilibrium distribution of contact rates $G(\lambda)$ exists and is unique. It has a strictly positive lower bound $\lambda$ and has a Pareto tail with tail parameter two. A strictly positive fraction of meetings accrues to a zero measure of middlemen who are in continuous contact with the market, $\Lambda > \int_0^\infty \lambda' dG(\lambda')$.

**Proposition**
Assume $c(\lambda) = c < \Delta/16\gamma$. The equilibrium distribution of trading rates inherits the tail properties of the contact rate distribution, i.e. it has a Pareto tail with tail parameter two.
**Why Does Heterogeneity Arise Endogenously?**

- To leverage gains from intermediation!
  - The current paper!

**Proposition**

*Everything I said, qualitatively hold for the planner as well!*

**Proposition**

*If you shut down intermediation, equilibrium and planner distribution are both homogeneous.*

- Inefficiency
  - Over-investment
  - Too few fast agents and too few slow agents
  - Different from this model, and AEW (Eca’15)
This model: symmetric equilibrium exists

- Farboodi, Jarosch and Shimer (2016)
- No symmetric equilibrium!

\[
\Lambda \lambda V
\]
Model Implications

- This model: symmetric equilibrium exists
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- This model: $\lambda \to \infty$: no dealer heterogeneity
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  - Agents can invest in bargaining ability
  - Even at the limit, both heterogeneity and inefficiency persists
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► This model: symmetric equilibrium exists
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  ▶ Agents can invest in bargaining ability
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► Why the difference?
  ▶ It is important to recognize agents’ ability to *invest* in *comparative advantage*
  ▶ Heterogeneity is not only in equilibrium “dependent” outcomes, but also in equilibrium fundamentals
Final Comments

- Proof of asymmetric equilibrium is for 2 dealers, does it really generalize to more?
- Asymmetric mixed strategy equilibria?
- \( \lambda_{D^Dz^D} > \lambda_{Dz^D} \)
- Single core outcome: full dry-out?
  - Uninteresting?
  - Babus and Parlatore (2016)