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 costumers
- Dealer network
  - Core-periphery dealer
  - Intermediation

Outline

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: $\lambda_D \to \lambda_D \mu_i^s \mu_i^b$
  - Inter dealer: $\lambda_{DD} \to \lambda_{DD} \left[\mu_i^s \left(\sum_j \mu_j^b \right) + \left(\sum_j \mu_j^s \right) \mu_i^b \right]$
- Bargaining: z_D, z_{DD} customer share

Equilibria

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

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

Multiple-Dealers Asymmetric Equilibrium

Core-Periphery Network

- Specialization
- Core versus peripheral dealer
  - Core dealers specialize in customers who trade often: *liquidity investors*
  - Peripheral dealers specialize in customers who don't: *buy-and-hold investors*
- Peripheral customers: lower value for lower price
  - Lower option value of search
  - At a lower price

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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

Literature: Ex-post Dealer Heterogeneity

- Ex-anter dealer heterogeneity
  - Atkeson, Eisfeldt, Weill (2015)
    - Dealers heterogeneous in exposure to aggregate risk
    - Agents with average exposure intermediate
  - Chang and Zhang (2016)
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- How does this paper related to them?
  - Micro-found heterogeneity among dealers using customer heterogeneity

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  - Micro-found heterogeneity among dealers using customer heterogeneity
- 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

Literature: Ex-post Dealer Heterogeneity

- 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: $\lambda_{DD} z_{DD} > \lambda_D z_D$

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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 λ
- Twist! λ chosen irrevocably at time 0, cost $c(\lambda)$ per meeting
  - $G(\lambda)$: population distribution of λ
  - Λ: 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

Results

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* $\underline{\lambda}$ *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!

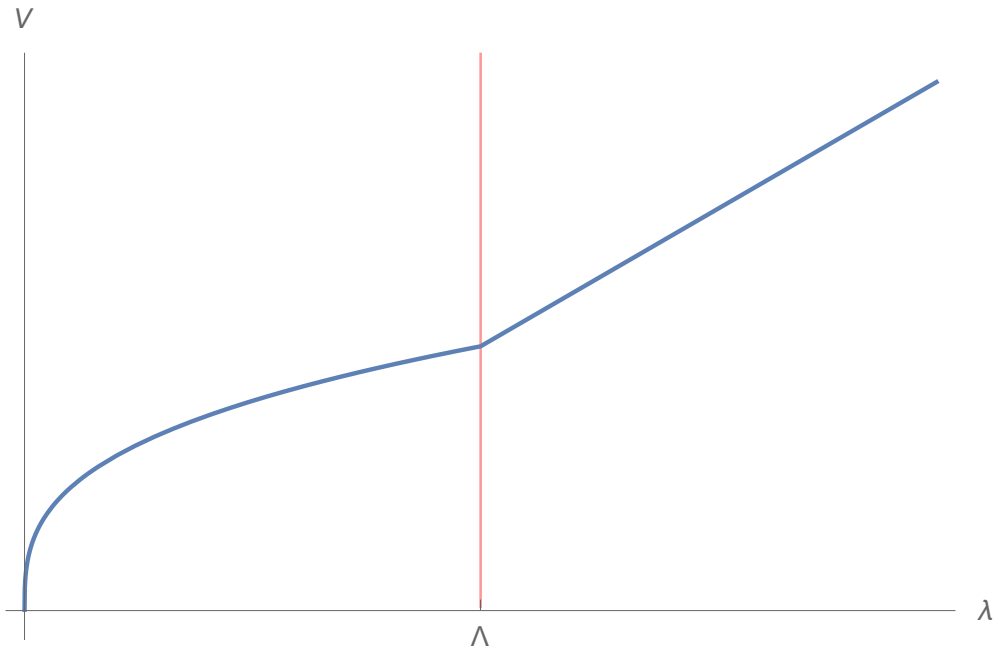
Proposition

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)

Model Implications

- This model: symmetric equilibrium exists
  - Farboodi, Jarosch and Shimer (2016)
  - No symmetric equilibrium!



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  - Agents can invest in bargaining ability
  - Even at the limit, both heterogeneity and inefficiency persists
- 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?
- $\lambda_{DD} z_{DD} > \lambda_D z_D$
- Single core outcome: full dry-out?
  - Uninteresting?
  - Babus and Parlatore (2016)