

# Reducing Opaqueness in Over-the-Counter Markets

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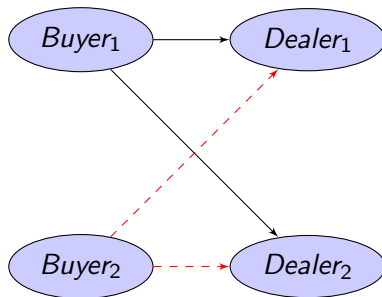
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# Opacity in OTC Markets

- ▶ Trades in OTC markets are conducted through bilateral negotiations. Bilateral trading impedes the public disclosure of information, which makes OTC markets opaque.

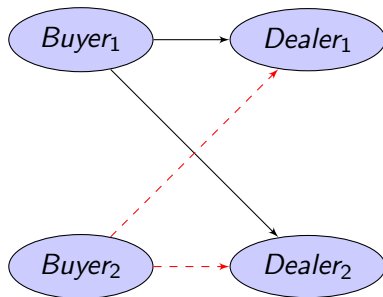
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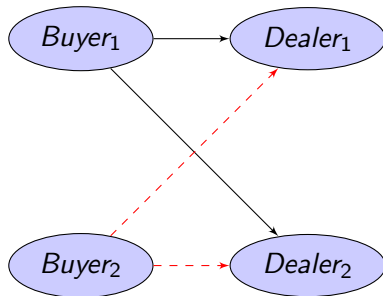
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- ▶ Based on empirical findings in the corporate bond market, opaqueness **reduces liquidity** in the OTC market.
- ▶ Opaqueness **exacerbates the recent financial meltdown**.  
Opaqueness  $\Rightarrow$  Loose risk control from regulators  $\Rightarrow$  Excessive risk-taking in OTC markets

# Policy Reforms on Reducing Opaqueness in OTC Markets

- ▶ Calls from Regulators

*“We pledged to work in a coordinated manner to accelerate the implementation of over-the-counter (OTC) derivatives regulation and supervision and to increase transparency and standardization. ”*

*– G20 Toronto Summit Declaration*

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- ▶ The Dodd-Frank Act and the MiFiD II

1. **Exchange Trading [Centralized Trading]**
2. Central Clearing
3. Standardization
4. Wider Trades Reports

# Questions Regarding to the Introduction of a Centralized Market

- ▶ As dealers can benefit from opaqueness (Madhavan (1995) and Yin (2005)), will the centralized market incentivize OTC market dealers to reduce opaqueness?

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- ▶ Will the centralized market replace the OTC market?

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- ▶ Answer:
  - ▶ Opaqueness in the OTC market enhances the centralized market's viability.
- ▶ Will the centralized market replace the OTC market?
- ▶ Answer:
  - ▶ It depends on the transaction cost in the centralized market and the transaction cost in the OTC market.

# A Brief View of the Model

## Search Model + Knightian Uncertainty

- ▶ The search model follows Spulber(1996), Rust and Hall(2003). In the search model, the buyer and the seller search through dealers for prices to trade, one dealer per round.

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# A Brief View of the Model

## Search Model + Knightian Uncertainty

- ▶ The search model follows Spulber(1996), Rust and Hall(2003). In the search model, the buyer and the seller search through dealers for prices to trade, one dealer per round.
- ▶ Knightian uncertainty represents opaqueness.
  - ▶ The Buyer's Set of Priors:

$$P^B(\epsilon) = \{(1 - \epsilon)P_a + \epsilon\mu : \mu \in M\}^1 \quad (1)$$


- ▶ The Seller's Set of Priors:

$$P^S(\epsilon) = \{(1 - \epsilon)P_b + \epsilon\mu : \mu \in M\} \quad (2)$$

In above equations,

- ▶  $P_a$  is the equilibrium distribution of the ask price,
- ▶  $P_b$  is the equilibrium distribution of the bid price,
- ▶  $\epsilon$  measures the degree of opaqueness.

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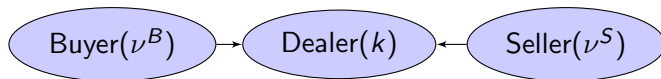
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# The Literature Review

- ▶ Studies on Market Fragmentations
  - ▶ Fragmented Markets v.s. Centralized Markets:  
Biais (1993), Madhavan (1995), Pagano and Roell (1996), de Frutos and Manzano (2002), Yin (2005)
  - ▶ Fragmented Markets coexist with Centralized Markets:  
Gehrig (1993), Rust and Hall (2003)
- ▶ Studies on Ambiguity or Knightian Uncertainty in Exchange Trading
  - ▶ Easley and O'Hara (2009, 2010a, 2010b)
- ▶ Modeling the OTC Market  
Spulber (1996), Rust and Hall (2003), Duffie, Garleanu, and Pedersen (2005, 2007), Zhu(2011), Hong and Wang(2012)

# The Benchmark Model

## The Environment



- ▶  $\nu^B$  is the buyer's internal valuation,  $\nu^B \sim \text{Uniform}[0, 1]$ .
- ▶  $\nu^S$  is the seller's internal valuation,  $\nu^S \sim \text{Uniform}[0, 1]$ .
- ▶  $k$  is the dealer's transaction cost,  $k \sim \text{Uniform}[\underline{k}, 1]$ .
- ▶  $\underline{k}$  is the lower bound of the dealer's transaction cost.
- ▶ All trades go through dealers.
- ▶ Traders (Buyers or Sellers) search across dealers for the ask and bid price.
- ▶ Traders and dealers have the same discount factor  $\beta$ .

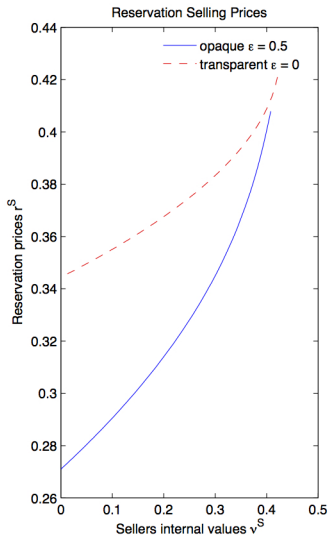
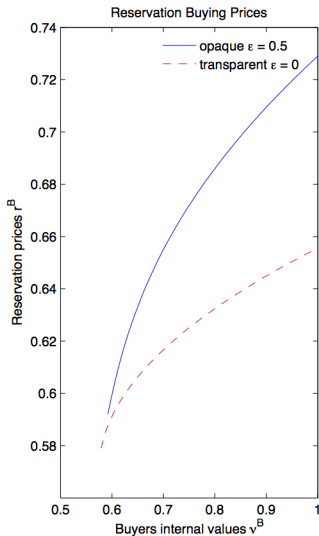
# The Benchmark Model

## The Equilibrium

- ▶ In the equilibrium:
  - ▶ Traders, conjecturing equilibrium prices with Knightian uncertainty, adopt the optimal stopping rule strategy to solve the search problem.
  - ▶ Dealers, conjecturing traders' strategies, set ask and bid prices, which maximize expected profits and clear inventory.
  - ▶ Ask prices and bid prices set by dealers coincide with equilibrium prices conjectured by traders.
- ▶ Equilibrium outcomes are distributions of the ask price and the bid price.

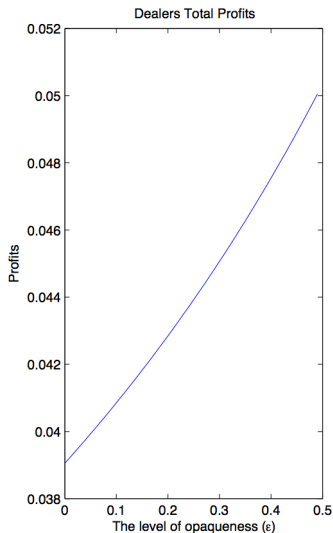
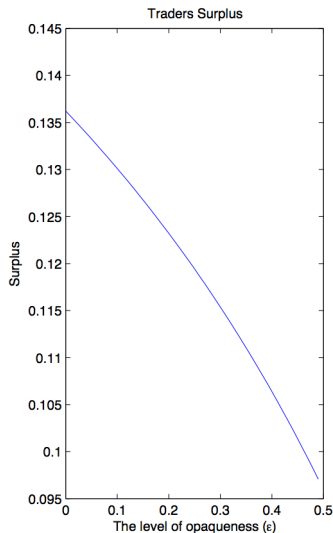
# The Benchmark Model

## Analyzing the Equilibrium: Traders' Reservation Values



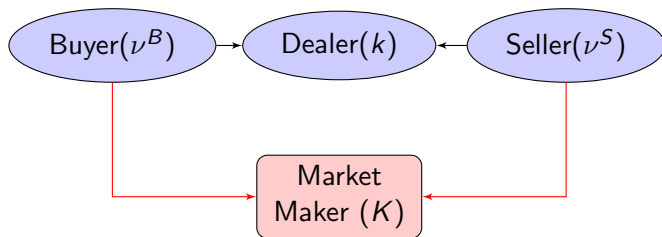
# The Benchmark Model

## Analyzing the Equilibrium: Welfare Analysis



# The Extended Model

## The Centralized Market



- ▶ The centralized market is a trading venue.
- ▶ There are  $m$  market makers on the trading venue.
- ▶ The  $m$  market makers are associated with transaction costs  $K_1, K_2, \dots, K_m$ .
- ▶ The  $m$  market makers post **publicly available ask and bid** prices on the trading venue.

# The Extended Model

## The Competitiveness of the Centralized Market

WOLG, I assume  $K_1 < K_2 < \dots < K_m$ .

- ▶ From the assumption, market maker  $K_1$  will become the natural monopolist in the centralized market.
- ▶ The Bertrand competition implies that  $K_1$ 's bid-ask spread shall be smaller than  $K_2$  in order to deter  $K_2$  from entering. That is,

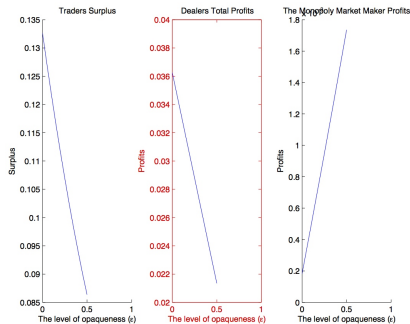
$$a_c - b_c \leq K_2. \quad (3)$$

- ▶ When  $a_c - b_c = K_2$ , the centralized market is **competitive**.
- ▶ When  $a_c - b_c < K_2$ , the centralized market is **noncompetitive**.

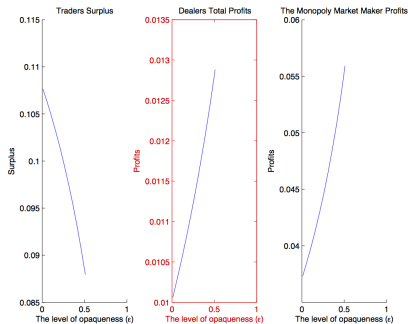
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## The Competitive Centralized Market v.s. the Noncompetitive Centralized Market

### Competitive



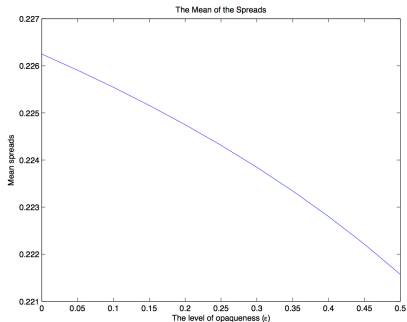
### Noncompetitive



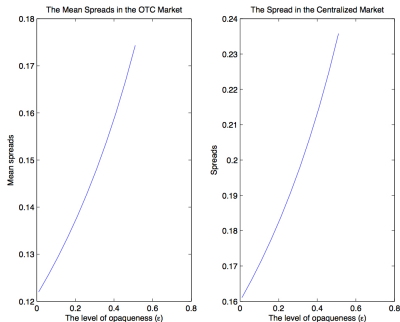
# The Extended Model

## The Competitive Centralized Market v.s. the Noncompetitive Centralized Market

### The Spread w/ Competitive

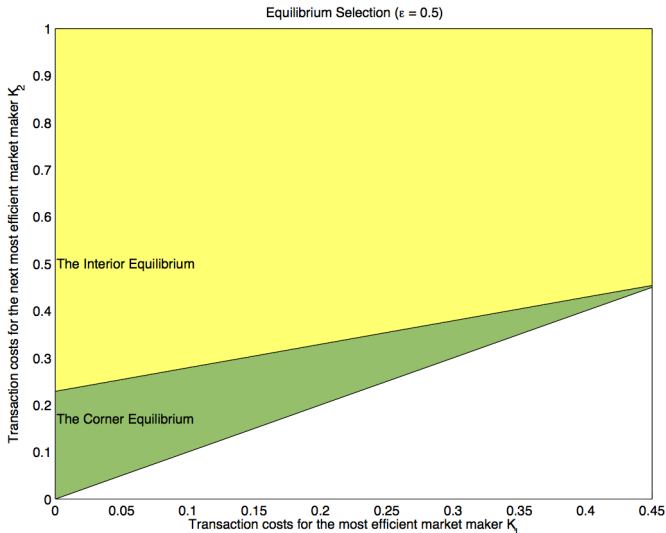


### The Spread w/ Noncompetitive



# The Extended Model

The Equilibrium Selection: Corner EQ = Competitive; Interior EQ = Noncompetitive



# Conclusion

## Findings

- ▶ Main Findings:
  - ▶ The competitive centralized market incentivizes OTC dealers to reduce opaqueness in the OTC market.
  - ▶ The noncompetitive centralized market does the opposite.

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## Findings

- ▶ Main Findings:
  - ▶ The competitive centralized market incentivizes OTC dealers to reduce opaqueness in the OTC market.
  - ▶ The noncompetitive centralized market does the opposite.
- ▶ Other Findings:
  - ▶ Greater opaqueness in the OTC market can help the centralized market to survive in the equilibrium.
  - ▶ Whether the centralized market can replace the OTC market depends on the comparison between their transaction costs.
  - ▶ If the centralized market is noncompetitive, then the viability of the OTC market also depends on its opaqueness.

# Conclusion

## Empirical Predictions

- ▶ Empirical predictions:
  - ▶ With the OTC market along,  
opaqueness  $\uparrow \Rightarrow$  the bid-ask spread  $\uparrow$ .
  - ▶ If the **competitive** centralized market coexists with the OTC market,  
opaqueness  $\uparrow \Rightarrow$  the bid-ask spread in OTC  $\downarrow$ , the bid-ask spread in the centralized market is constant.
  - ▶ If the **noncompetitive** centralized market coexists with the OTC market,  
opaqueness  $\uparrow \Rightarrow$  the bid-ask spread in OTC  $\uparrow$ , the bid-ask spread in the centralized market  $\uparrow$ .

Thank you!