

# Why Trade Over-the-Counter? When Investors Want Price Discrimination

Discussion by Cecilia Parlato

NYU Stern

AFA

January 4, 2020

# Overview

**Question** Why trade over-the-counter?

# Overview

**Question** Why trade over-the-counter?

**This paper** When investors want price discrimination

# Overview

**Question** Why trade over-the-counter?

**This paper** When investors want price discrimination

▶ **Mechanism:**

- ▶ Informed investors create adverse selection in the market
- ▶ Bid-ask spreads are higher in the presence of adverse selection
- ▶ Uninformed investors want to separate from informed investors

# Overview

**Question** Why trade over-the-counter?

**This paper** When investors want price discrimination

▶ **Mechanism:**

- ▶ Informed investors create adverse selection in the market
- ▶ Bid-ask spreads are higher in the presence of adverse selection
- ▶ Uninformed investors want to separate from informed investors

▶ **Main results:**

- ▶ In the presence of adverse selection investors want price discrimination
  - ▶ Investors labeled as informed investors (speculators) trade in exchanges
  - ▶ Investors labeled as uninformed investors (hedgers) trade OTC (not anonymous)

# Overview

**Question** Why trade over-the-counter?

**This paper** When investors want price discrimination

▶ **Mechanism:**

- ▶ Informed investors create adverse selection in the market
- ▶ Bid-ask spreads are higher in the presence of adverse selection
- ▶ Uninformed investors want to separate from informed investors

▶ **Main results:**

- ▶ In the presence of adverse selection investors want price discrimination
  - ▶ Investors labeled as informed investors (speculators) trade in exchanges
  - ▶ Investors labeled as uninformed investors (hedgers) trade OTC (not anonymous)
- ▶ Spreads increase in the degree of adverse selection
- ▶ Welfare may increase or decrease with OTC depending on adverse selection

# The model

- ▶ One indivisible asset with unobserved value  $\tilde{v} \in \{-1, 1\}$
- ▶ Three types of agents: competitive dealer, competitive market maker (MM) and investors
- ▶ Investors can either buy or sell one unit of asset w/ equal probability
  - ▶ Hedgers: get private benefit  $b_i$  if they sell (buy) when they are sellers (buyers)
  - ▶ Speculators: no private benefit, private information about the asset value
- ▶ Two trading venues
  - ▶ Exchange: MM posts bid and ask prices, same for everyone
  - ▶ OTC: investor requests quotes from dealer, quotes are investor specific

# The model

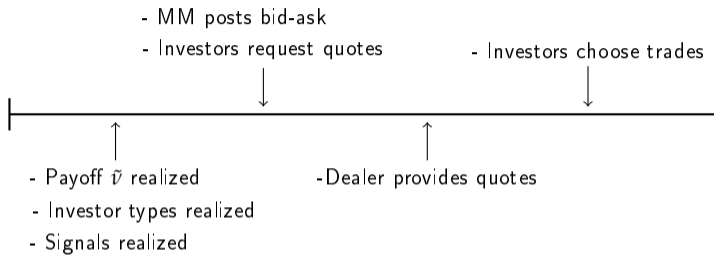
- ▶ One indivisible asset with unobserved value  $\tilde{v} \in \{-1, 1\}$
- ▶ Three types of agents: competitive dealer, competitive market maker (MM) and investors
- ▶ Investors can either buy or sell one unit of asset w/ equal probability
  - ▶ Hedgers: get private benefit  $b_i$  if they sell (buy) when they are sellers (buyers)
  - ▶ Speculators: no private benefit, private information about the asset value
- ▶ Two trading venues
  - ▶ Exchange: MM posts bid and ask prices, same for everyone
  - ▶ OTC: investor requests quotes from dealer, quotes are investor specific
- ▶ Friction: Asymmetric information, Three sources
  - ▶ Speculators receive private signals about  $\tilde{v}$
  - ▶ Imperfect type labels for each investor
  - ▶ Hedgers have private unobserved valuations  $b_i$



# The model

- ▶ One indivisible asset with unobserved value  $\tilde{v} \in \{-1, 1\}$
- ▶ Three types of agents: competitive dealer, competitive market maker (MM) and investors
- ▶ Investors can either buy or sell one unit of asset w/ equal probability
  - ▶ Hedgers: get private benefit  $b_i$  if they sell (buy) when they are sellers (buyers)
  - ▶ Speculators: no private benefit, private information about the asset value
- ▶ Two trading venues
  - ▶ Exchange: MM posts bid and ask prices, same for everyone
  - ▶ OTC: investor requests quotes from dealer, quotes are investor specific
- ▶ Friction: Asymmetric information, Three sources
  - ▶ Speculators receive private signals about  $\tilde{v}$  **Adverse Selection**
  - ▶ Imperfect type labels for each investor **Allows to break anonymity OTC**
  - ▶ Hedgers have private unobserved valuations  $b_i$  **Elastic demand**

# Timing



# Trading strategies

- ▶ At the available bid and ask prices, investors have three options: buy, sell, no trade.
  - ▶ Payoff from selling in venue  $j$

$$bid_j + \text{private benefit}_i - \mathbb{E}[v | \text{Information}_i]$$

- ▶ Payoff from buying

$$\mathbb{E}[v | \text{Information}_i] - ask_j$$

- ▶ from not trading 0

- ▶ Investors sells

$$\max \left\{ \underbrace{0}_{\text{no trade}}, \max_{j \in J^i} \left\{ \underbrace{\mathbb{E}[v | \text{Information}_i] - ask_j}_{\text{buy in venue } j} \right\} \right\} < \max_{j \in J^i} \left\{ \underbrace{bid_j + \text{private benefit}_i - \mathbb{E}[v | \text{Information}_i]}_{\text{sell in venue } j} \right\}$$

- ▶ An investor buys if

$$\max \left\{ 0, \max_{j \in J^i} \{ bid_j - \mathbb{E}[v | \text{Information}_i] \} \right\} < \max_{j \in J^i} \{ \mathbb{E}[v | \text{Information}_i] + \text{private benefit}_i - ask_j \}$$

# Adverse Selection and Price Discrimination

- ▶ Half bid-ask spread in exchange without OTC market

- ▶ No informed investors  $\mu = 0$

$$\hat{S}_e = 0$$

- ▶ With informed investors  $\mu > 0$

$$\hat{S}_e > 0$$

⇒ Uninformed investors want to separate from informed investors

# Adverse Selection and Price Discrimination

- ▶ Half bid-ask spread in exchange without OTC market

- ▶ No informed investors  $\mu = 0$

$$\hat{S}_e = 0$$

- ▶ With informed investors  $\mu > 0$

$$\hat{S}_e > 0$$

⇒ Uninformed investors want to separate from informed investors

- ▶ OTC gives some uninformed investors the opportunity to separate (labels are observed!)

- ▶ Investors labeled as speculators trade in the exchange and investors labeled as hedgers trade OTC
  - ▶ Lower adv. selection in OTC + competitive dealer: OTC spread is lower

$$S_e > \hat{S}_e > S_o$$

- ▶ Adverse selection increases all spreads
  - ▶ Welfare can increase or decrease with OTC

# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types

# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types
    - ▶ If types were fully unobserved (no labels),  $S_e = S_o$
    - ▶ Fully revealing labels,  $S_e > S_o = 0$  (?)
  - ▶ Hedgers private valuation: Elasticity of demand

# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types
    - ▶ If types were fully unobserved (no labels),  $S_e = S_o$
    - ▶ Fully revealing labels,  $S_e > S_o = 0$  (?)
  - ▶ Hedgers private valuation: Elasticity of demand
2. Hedgers vs. Speculators  $\Rightarrow$  uninformed vs. informed



# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types
    - ▶ If types were fully unobserved (no labels),  $S_e = S_o$
    - ▶ Fully revealing labels,  $S_e > S_o = 0$  (?)
  - ▶ Hedgers private valuation: Elasticity of demand
2. Hedgers vs. Speculators  $\Rightarrow$  uninformed vs. informed
3. Welfare

## Welfare

- ▶ Only gains from trade come from trading with hedgers

## Welfare

- ▶ Only gains from trade come from trading with hedgers
- ▶ Welfare **cost** of adverse selection: Non-realized hedging trades

$$\underbrace{(1 - \gamma) \int_0^{S_e} bdb}_{\text{hedgers labeled as speculators}} + \underbrace{\gamma \int_0^{S_o} bdb}_{\text{hedgers labeled as hedgers}} = \frac{1}{2} \left( (1 - \gamma) S_e^2 + \gamma S_o^2 \right)$$

- ▶ Adverse selection increases all spreads but differently:  $S_i = s(\beta_i)$ , where  $s' > 0$  and  $s'' < 0$  and

$$\beta_e \geq \hat{\beta}_e \geq \beta_o.$$

- ▶ Effect of OTC depends on adverse selection
  - ▶ Result: If  $\mu < \mu^*$ , welfare decreases with OTC markets and it increases otherwise.

# Welfare

- ▶ Only gains from trade come from trading with hedgers
- ▶ Welfare **cost** of adverse selection: Non-realized hedging trades

$$\underbrace{(1 - \gamma) \int_0^{S_e} bdb}_{\text{hedgers labeled as speculators}} + \underbrace{\gamma \int_0^{S_o} bdb}_{\text{hedgers labeled as hedgers}} = \frac{1}{2} \left( (1 - \gamma) S_e^2 + \gamma S_o^2 \right)$$

- ▶ Adverse selection increases all spreads but differently:  $S_i = s(\beta_i)$ , where  $s' > 0$  and  $s'' < 0$  and

$$\beta_e \geq \hat{\beta}_e \geq \beta_o.$$

- ▶ Effect of OTC depends on adverse selection
  - ▶ Result: If  $\mu < \mu^*$ , welfare decreases with OTC markets and it increases otherwise.
- ▶ Intuitively: Having OTC markets
  - ▶ increases trades of hedgers with correct labels who trade OTC
  - ▶ decreases trades of hedgers with incorrect labels who trade in the exchange
  - ▶ Overall effect depends on distributional assumptions

# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types

# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types
    - ▶ If types were fully unobserved (no labels),  $S_e = S_o$
    - ▶ Fully revealing labels,  $S_e > S_o = 0$
  - ▶ Hedgers private valuation: Elasticity of demand

# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types
    - ▶ If types were fully unobserved (no labels),  $S_e = S_o$
    - ▶ Fully revealing labels,  $S_e > S_o = 0$
  - ▶ Hedgers private valuation: Elasticity of demand
2. Hedgers vs. Speculators  $\Rightarrow$  uninformed vs. informed

# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types
    - ▶ If types were fully unobserved (no labels),  $S_e = S_o$
    - ▶ Fully revealing labels,  $S_e > S_o = 0$
  - ▶ Hedgers private valuation: Elasticity of demand
2. Hedgers vs. Speculators  $\Rightarrow$  uninformed vs. informed
3. Welfare  $\Rightarrow$  Robustness (?) + Policy recommendation



# Comments

1. Many sources of asymmetric information!
  - ▶ Speculator's private information leads to adverse selection
  - ▶ Partially unobserved investor types
    - ▶ If types were fully unobserved (no labels),  $S_e = S_o$
    - ▶ Fully revealing labels,  $S_e > S_o = 0$
  - ▶ Hedgers private valuation: Elasticity of demand
2. Hedgers vs. Speculators  $\Rightarrow$  uninformed vs. informed
3. Welfare  $\Rightarrow$  Robustness (?) + Policy recommendation
4. Empirical predictions and other theories

# Extra

- ▶ Extra