

Financial Markets Microstructure

Lecture 13

Market Transparency
Chapter 8 of FPR

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Previously on FMM

- **Fragmentation** is ubiquitous
- It is costly for uninformed traders, who would prefer to coordinate on a single market
- Other costs may include less risk sharing and less competition among dealers (see book)
- Some benefits are possible (larger depth), depending on setting and trading format

Today: Market transparency

- Financial markets are among the more transparent ones
 - Historical price and transaction data often available
- But there are a ways to go
 - Often you do not know the price at which your trade will be executed.
- Today: discuss how transparency affects market outcomes
- Related to last week's discussions
- Different kinds of transparency have different effects

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Market transparency: introduction

- Market transparency can refer to different information
 - **Pre-trade information:** quotes and state of LOB
 - **In-trade information:** trader identity
 - **Post-trade information:** realized trades and prices
- Exchanges profit from selling this type of data
 - Different traders end up with different information sets
 - Some types of traders may benefit from a lack of transparency

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Market transparency: regulation

Transparency also **regulated**

- In both Europe and the US: rules to assure pre-trade information
- Also, firms must disclose relevant information
- The US has a centralized system for collecting post-trade information, but not Europe

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General ideas

- 1 In an opaque market, search costs confer monopoly powers to dealers
 - 2 Transparency may foster competition, but also collusion
 - 3 Risk-sharing may be better when markets are opaque
- Before we begin: remember how we discussed that “private” info is out there, you just need to find it and put it together?
 - Same thing with transparency – “opaque” information is not necessarily “inaccessible”, but can just be “not accessible enough”
 - An (extreme) example of poorly informed trading

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Quote transparency

- In some markets LOB and dealer quotes are visible (possibly at a cost)
- In some other (esp. illiquid) markets trader must search for quotes
 - or approach dealers in search of price improvements
- How do **search costs** affect market outcomes?
- (This was the problem 3 in PS1)

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Search costs

Idea based on ?'s **chain store paradox**

- Imagine a product market with consumers and firms
- Firms set prices not initially seen to consumers
- Suppose consumers are searching stores sequentially to find the best price, searching costs c per store
- Look for an equilibrium in which all stores set same price p
- Each store has market power: can charge customer up to $p + c$ if desired
- **Equilibrium:** stores set p at monopoly level

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Search costs

- The situation is the same in a financial market with search cost
 - It doesn't pay to be the cheapest dealer if you can't advertise the price
 - Can always increase price and still be preferred due to search cost
 - So incentives to exploit the price, no incentives to improve the price
- Model conclusion does not depend on size of search cost (ignore what textbook says about it)
 - Although irl frictions probably increase in search cost – fancier models capture this
- **Welfare** implications of search costs:
 - **Dealers** have market power \Rightarrow **higher profits**
 - All **traders are worse off**, the less sophisticated ones more so (if we maintain the assumption their trades are less elastic)
- Empirical evidence from US municipal bond markets does show very high trading costs, especially for retail-sized trades (??)

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Quote transparency

- Let's look at another dimension of quote transparency
- While price of the first unit is often observable...
 - US protects NBBO orders for each stock
 - Exchanges or dealers may only quote best bid&ask
- ...**depth** can be more difficult to gauge
- If depth is volatile (which it is), may trade at the “wrong time”

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Uncertainty and price sensitivity

- Consider a Kyle model with random depth $1/\lambda$.
- **Transparent market:** insider demand is inversely related to price sensitivity λ : $x^T \sim \frac{1}{\lambda}$
- **Opaque market:** traders face uncertainty, so their demand is inversely related to expected price sensitivity: $x^O \sim \frac{1}{\mathbb{E}(\lambda)}$
- Convex function. Use Jensen's inequality:

$$\mathbb{E}\left(\frac{1}{\lambda}\right) > \frac{1}{\mathbb{E}(\lambda)} \quad \Longleftrightarrow \quad \mathbb{E}[x^T] > x^O$$

- **More (informed) trading in transparent market**
 - Risk of high λ (shallow market) provides stronger incentive to reduce x than the incentive to increase x from the chance of low λ .

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Order flow transparency

- In some markets (OTC, FX) an order may be filled simultaneously by different liquidity providers
- What does it matter if they can or cannot observe the whole order flow?
 - We saw one answer already (Glosten vs Kyle)
 - Will now look at another way to model this

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Order flow: Model

- Consider a simple variation on a Glosten-Milgrom model
- **Value:** high v^H or low v^L with equal probability
 - Mean: $\mu = (v^H + v^L)/2$
- **Dealers:** set quotes, competitive, risk neutral
- **Traders:** two unit market orders arrive
 - With prob. π : both are from informed trader(s) (there was an info event)
 - With prob. $1 - \pi$: both from liquidity traders; one seller, one buyer
- **Idea:** higher order flow correlation when traders are informed. Intuition:
 - Informed traders: if all learn that the asset value is, say, high, then should all want to buy
 - Liquidity traders: suppose pension fund decides it wants a less risky portfolio. (Probably) uncorrelated with other liquidity traders' decisions. For simplicity we strengthen that to perfect negative correlation.

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Order flow: Equilibrium

- **Opaque:** dealers quote without seeing the entire market order flow
 - As in chapter 3, $a^O = \mu + \pi(v^H - \mu)$ and $b^O = \mu - \pi(\mu - v^L)$
- **Transparent:** dealers condition quotes on both orders
 - Two buyers: must be informed, $a^T = v^H$
 - Two sellers: must be informed, $b^T = v^L$
 - One of each: trade at μ
- Transparent (T) versus opaque (O) market:
 - T better than O for the uninformed: avoid adverse selection premium
 - Better price discovery in T than in O : private information revealed
 - The informed prefer O : get better prices

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Post-trade transparency

- If orders arrive sequentially, what effect does information about **past orders** have?
- **Value**: high v^H or low v^L with equal probabilities
 - Mean: $\mu = (v^H + v^L)/2$
- **Dealers**: set quotes, competitive, risk neutral
- **Traders**: two traders arrive, submit unit market orders
 - With prob. π : both are informed
 - With prob. $(1 - \pi)/2$: both liquidity traders; first seller, then buyer
 - With prob. $(1 - \pi)/2$: both liquidity traders; first buyer, then seller
- **Transparent market**: All dealers observe the first order d_1
 - Set $a_1 = \mu + \pi(v^H - \mu)$ and $a_{2,d_1} = \mathbb{E}[v|d_1, \text{buy}]$

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Post-trade transparency: Period 2

Opaque market: One dealer gains informational advantage. Focus on **ask side**

- **Period 2**. Denote the dealer who observed period-1 trade by **I**, and the other dealer by **U**.
 - For simplicity, suppose **I** sets price after observing **U**'s quote
 - **Dealer I**: Suppose **I** saw the first trade, and second trade is a buy, and **U**-dealer quotes a_2^U :
 - If the first trade was a sell, **I** expects $\mathbb{E}[v] = \mu$, so set price at $a_{2s}^I = a_2^U - \epsilon$.
 - If it was a buy, **I** knows $v = v^H$, so quote $a_{2b}^I \geq v^H$
 - **I** picks off period-2 buy order if d_1 was a sell; otherwise leaves it to **U**
 - **Dealer U**: How to quote if you didn't see the first trade and second trade is buy?
 - **U** knows that they only get to trade if $v = v^H$ (otherwise picked off by **I**)
 - Thus, uninformed dealers need to quote $a_2^U = v^H$
 - In the end, quotes are $a_2^U = v^H$, $a_{2s}^I = v^H - \epsilon$, $a_{2b}^I = v^H$.
 - (We'd get the same if **I** and **U** set quotes simultaneously)

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Post-trade transparency: Period 1

- **Period 1.** The sequential information advantage uncovered in the previous slide can make dealers bid keenly for the first order (Forex dealers often said to quote negative spread to large traders)
 - In second period, I 's profit is $(1 - \pi)(v^H - v^L)/2$. U 's profit is zero
 - Competition leads the first period half-spread to be reduced by this amount, to $(2\pi - 1)(v^H - v^L)/2$ (dealers undercut each other to obtain information contained in first order)
 - The uninformed's aggregate trading cost is $\pi(v^H - v^L)$ - double the cost under transparency. Why is this?
- Would dealers commit to transparency?
 - No, there is always an individual incentive to hide your orders (section 8.4.2)
 - May explain the rise of less transparent trading venues

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Post-trade transparency: Collusion

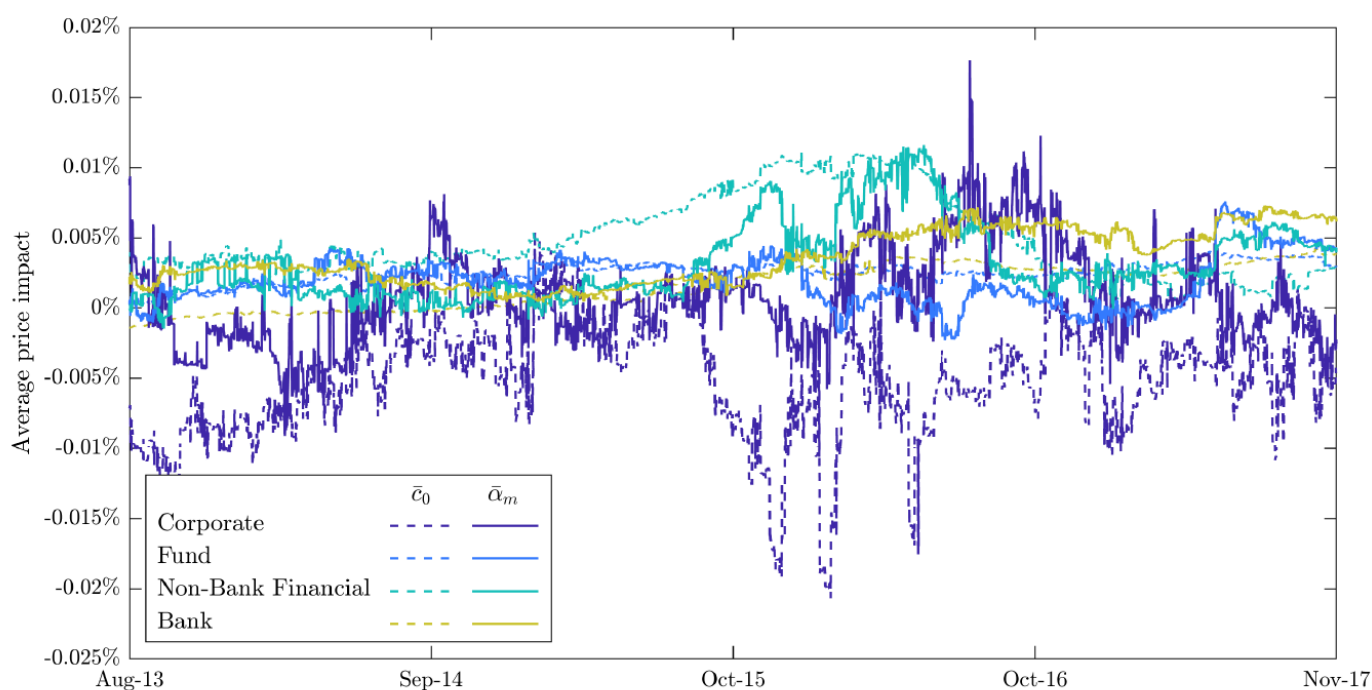
- If dealers are not perfectly competitive, they can try to **collude** to increase their profits
- Cartels are sustained via a threat of **punishment** in case anyone **deviates**
- Prerequisite for collusion: ability to detect deviations
 - Transparency improves this ability
 - So may help collusion

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In-trade information

- Transparency may relate not only to quote and order data, but also to **trader identity**.
 - LOB is usually anonymous and thus opaque
 - dealer interactions can be personal
- If trader's identity is visible, it may affect the prices they get
 - Institutional investors rarely engage in informed trading, so will get good price;
 - Insiders will get bad prices.
 - See the figure for FX market on the next slide (from ?)
- If identity is limited to some identifier in the system, trader can still build a reputation through history of actions

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The cross-sectional average contemporary (\bar{c}_0^r) and permanent ($\bar{\alpha}_m$) price impact

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where

- **fund** includes pension funds, hedge funds, and sovereign wealth funds;
- **nonbank** financial refers to insurance companies, brokers, and clearing houses;
- **corporate** comprises any non-financial organization
- but ~ 80% transactions are bank-bank

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In-trade information

- There may be ways to signal or credibly **disclose** the fact that your **trade is uninformative**
 - E.g. can advertise trade a few days in advance – “sunshine trading”
- In this case they *will* be used because uninformed traders will want to separate – **transparency will prevail**
- Same may happen due to **cream-skimming**
 - Large banks can execute trades in their own dark pools instead of forwarding to the market
 - They would pick off profitable trades and forward the rest
 - The market would account for this and set wider spreads for trades that make it to the market
 - Reducing cream-skimming has been one focus of MiFID II regulation.

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In-trade information

- In all of the above, transparency leads to reallocation of welfare from insiders to the uninformed.
 - That's why regulators push for transparency and the market resists
 - You can also argue that transparency would reduce informed trading and reduce price discovery
- Hirshleifer noted that some risk-sharing trades are better conducted before information arrives
 - Think of health insurance
 - Possible to share risks before we know who suffers illness
 - Too late to share risks after the illness is known; market break-down

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Conclusion

- **Transparency** mostly reallocates welfare across market participants
 - Uninformed traders benefit, so T **helps liquidity**
 - Insiders may lose, so T **worsens price discovery**
 - Dealers may win or lose
- But transparency may also impede risk sharing, and have adverse effects when it is asymmetrically distributed
- Opaqueness can be good in limit books
 - Hidden limit orders help uninformed traders hedge their positions where making these orders visible would by itself create adverse price movements

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Exercise for next week

- Read the article on MiFID II (on Absalon). Discuss the following questions:
 - What did MiFID II change in regards to market transparency? (There are many aspects to this.) How will these changes affect market outcomes?
- Read the article on LSE acquiring Refinitiv. What implications can this have for market transparency (e.g. on LSE's own trading platform)?
- Do ex.2 after ch.8 (p.303) on price discovery