Trading and market microstructure

FN 451

Today's outline

I) Trading systems
II) Transaction costs
III) Market quality and investibility

TRADING SYSTEMS

Execution systems

- The *execution system* matches the buyers with the sellers.
  - quote-driven markets
  - order-driven markets
  - hybrid markets (mix of above)

Quote-driven dealer markets

- In *pure quote-driven markets*, dealers participate in every trade.
- Dealers provide all the liquidity and quote *bid* and *ask* prices. Those quotes are firm for some specified size, i.e., the dealers must honor them.
- If the investor wants to trade a different size, there will be negotiation between the investor and the dealer.

- Buy orders decrease the dealer's inventory position whereas sell orders increase the dealer's inventory position.
- The dealer can then attract or reject order flow given her inventory position. The bid-ask spread's placement will then reflect her inventory position.

- When the dealer's inventory position is low, she sets both a high bid price and a high ask price.
- When the dealer's inventory position is high, she sets both a low bid and a low ask.

Examples of *Dealer Markets*:

- NASDAQ
- London International Stock Exchange (SEAQ)
- OTC Bond Markets
- Foreign Exchange Markets

General features of a dealer market

- Multiple dealers, geographically dispersed, electronically linked.
- No consolidation of trading: No “floor”.
- Virtually all customer trades are with a dealer.
- The dealer is the intermediary.
- Customers rarely trade against other customers.
- Dealers trade among themselves.
- Regulation and transparency are poor relative to floor markets.
- Dealers may compete among themselves, but have a lot of information and market power relative to customers.

Order-driven markets

- In an order-driven auction market, all traders issue orders to the exchange.
- Buyers and sellers regularly trade with each other without the intermediation of dealers.
- But dealers may choose to trade.
- *Order driven markets* may be organized as continuous markets or as call markets.

Order driven market

- Most important exchanges are order-driven markets.
- Most newly organized trading systems are electronic order-driven markets.
- All order-driven markets use *order precedence rule* and *trade pricing rule*.

Examples of pure order-driven markets

- Tokyo Stock Exchange,
- KRX (previously KSE, KOSDAQ)
- ASEAN markets
- Paris Bourse,
- Toronto Stock Exchange,
- Most Future Markets,
- Most European Exchanges for equities (Milan, Barcelona, Madrid, Bilbao, Zurich,….)

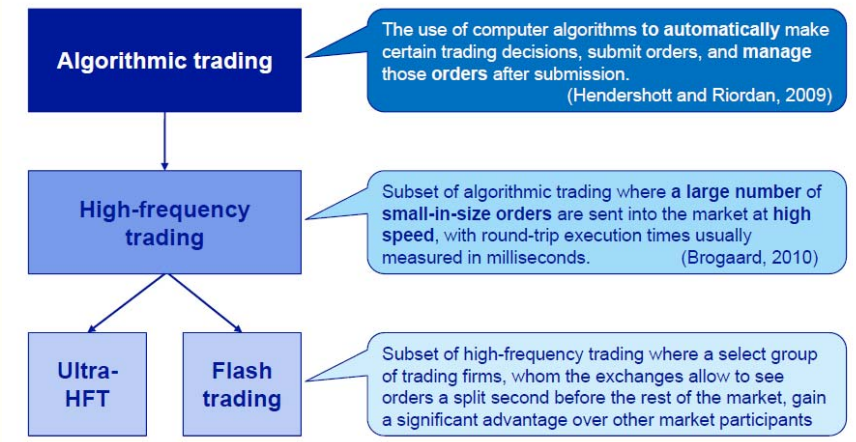
Independent trading platforms

- ECNs: Electronic communications platforms connects brokerages and individual traders without having to go through central clearing system.
- Ex. Instinet Corp. Ikon Group

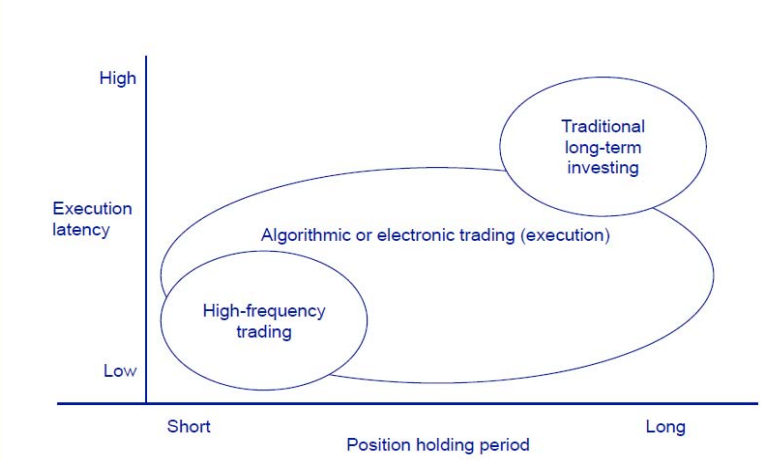
Drivers of change on developed demutualized markets: Case of TSE

- The rise of non-centralized electronic exchanges
- About 60 percent of equity volume in the United States is from high-frequency trading, significantly higher than Japan. Just 10 percent of global financial firms with high-frequency businesses are active in Tokyo (Reuters)

Key terms



Traditional investing vs AT vs HFT



Source: Aldridge 2010

Algorithmic trading strategies

Name	Description of strategy
Trade execution algorithms	Designed to minimise the price impact of **executing trades of large volumes** by 'shredding' orders into smaller parcels and slowly releasing these into the market.
Strategy implementation algorithms	Designed to read real-time market data and **formulate trading signals** to be executed by trade execution algorithms. This may involve automatically **rebalancing portfolios** when certain pre-specified tolerance levels are exceeded, **searching for arbitrage opportunities**, automatic quoting and hedging in a **market maker-type role**, and producing trading signals from technical analysis.
Stealth/gaming algorithms	Designed to take advantage of the price movement caused when large trades are filled, and also to **detect and outperform other algorithmic strategies**.

Source: Aldridge 2010 High-Frequency Trading: A Practical Guide to Algorithmic Strategies and Trading Systems. John Wiley & Sons.

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HFT Strategies

Name	Description of strategy
Electronic market making	**Liquidity-providing strategies** that mimic the traditional role market makers once played. These strategies involve making a two-sided market aiming at **profiting by earning the bid-ask spread**. This has evolved into what is known as Passive Rebate Arbitrage.
Statistical arbitrage	Traders look to correlate prices between securities in some way and trade off of the **imbalances in those correlations**.
Liquidity detection	Traders look to **decipher whether there are large orders** existing in a matching engine by sending out small orders ("pinging") to look for where large orders might be resting. When a small order is filled quickly, there is likely to be a large order behind it.

Source: Aldridge 2010 High-Frequency Trading: A Practical Guide to Algorithmic Strategies and Trading Systems. John Wiley & Sons.

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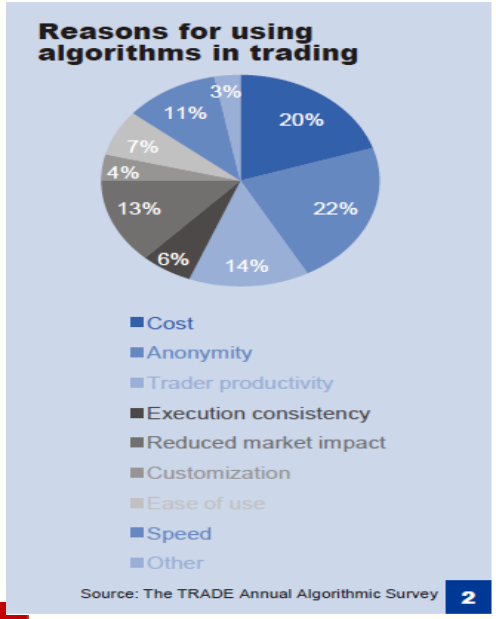

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TRANSACTION COSTS

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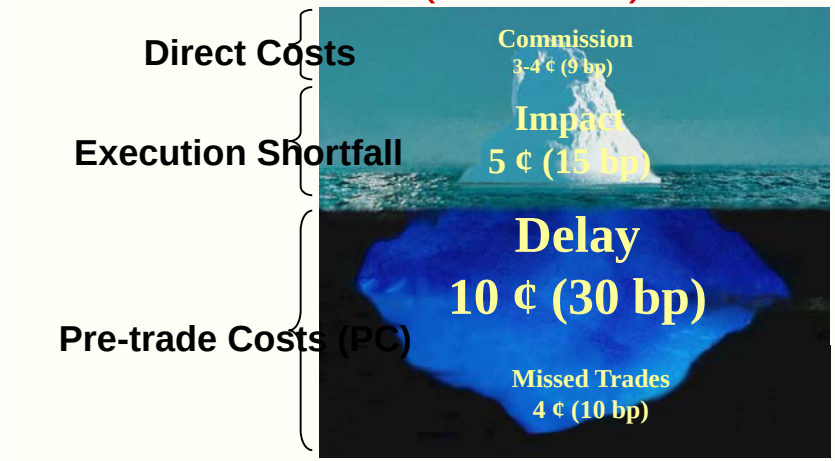
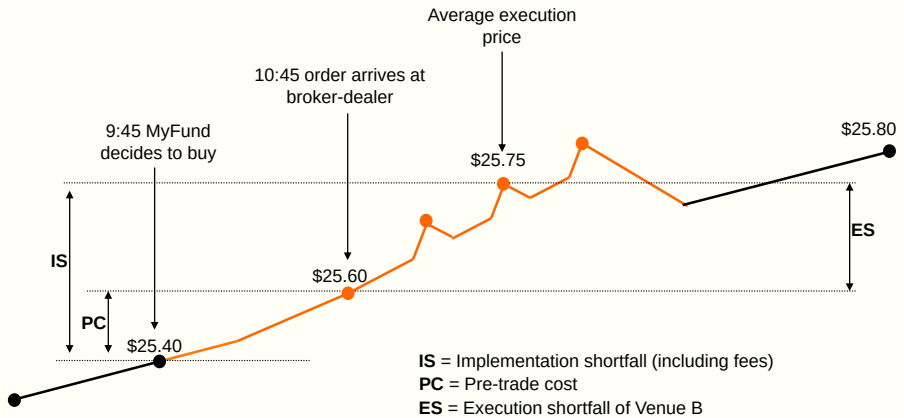
The Plexus Iceberg of Transaction Costs (US, 2007)

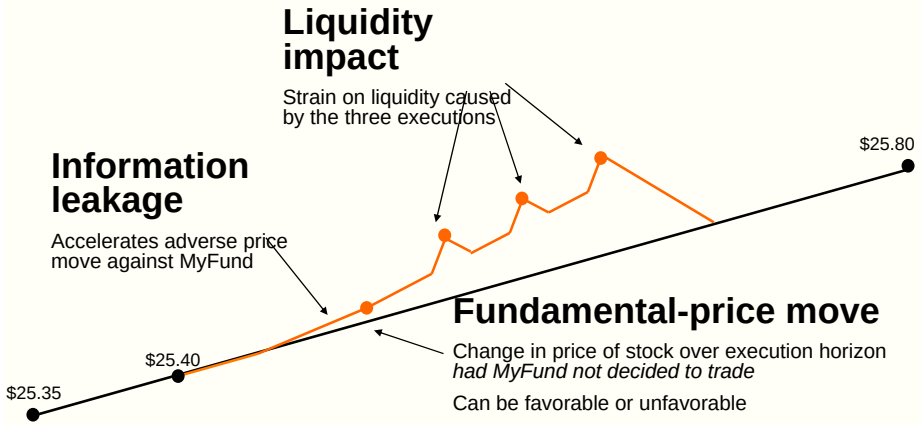


Implementation Shortfall



Source: Goldman Sachs, Trading and Market Structure Analysis

Factors affecting Implementation Shortfall



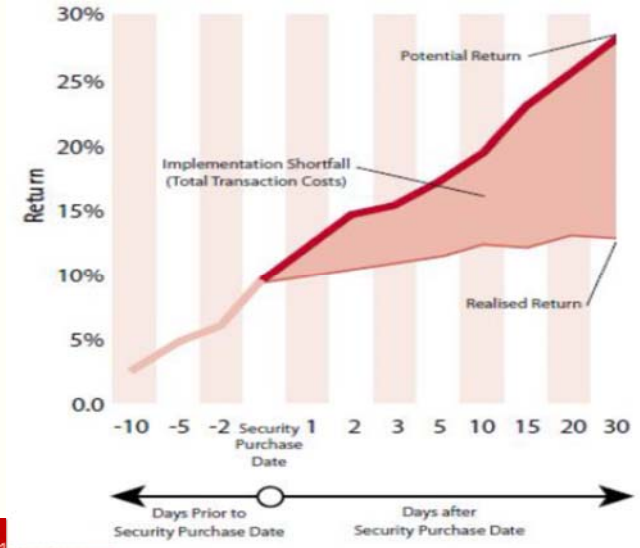
Source: Goldman Sachs, Trading and Market Structure Analysis

Computing volume weight avg price (avg execution price)

- You have received an order to buy 1 mn shares of stock A. Compute VWAP and the end of the day profit/loss position.

Time	Execution price	Quantity	Unfilled	Q x P
9.00 am	100	100,000	900,000	10,000,000
10.00 am	101	150,000	750,000	15,150,000
11.00 am	102	300,000	450,000	30,600,000
12.00 pm	105	100,000	350,000	10,500,000
2.00 pm	104	200,000	150,000	20,800,000
3.00 pm	103	100,000	50,000	10,300,000
4.00 pm	101	50,000	-	5,050,000
4.30 pm	99			
VWAP				102.4
Profit/loss per share				-3.4

Realized return and potential return

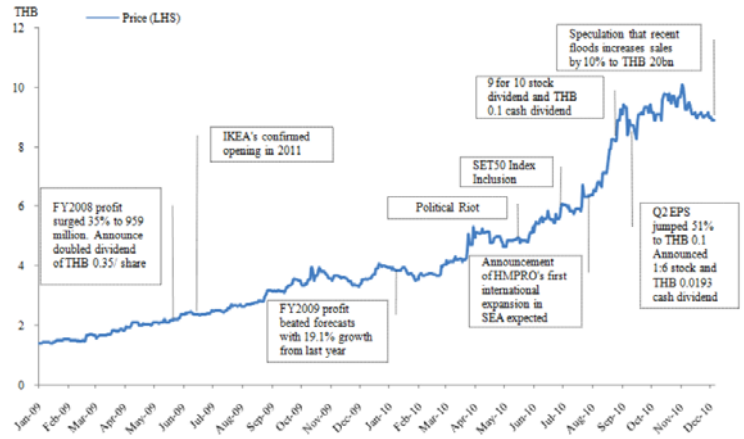


MARKET QUALITY AND INVESTABILITY

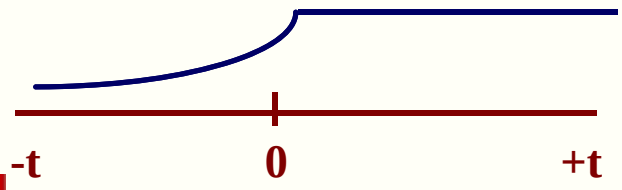
Components of market quality

- Information efficiency
- Liquidity (part of transaction costs)
- Transaction costs
- Price discovery

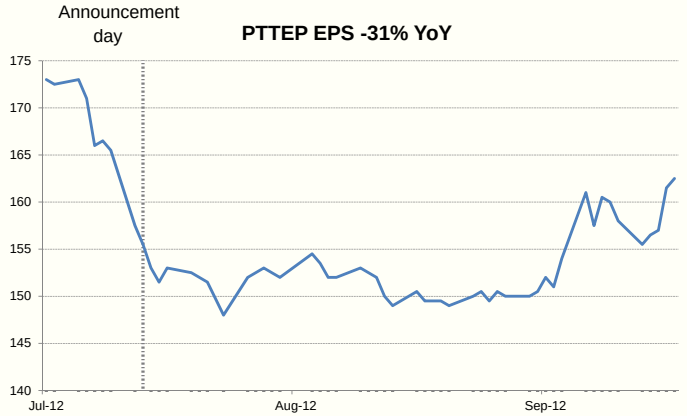
HMPRO price response to news



Information leakage



Earnings Announcement & Stock Price



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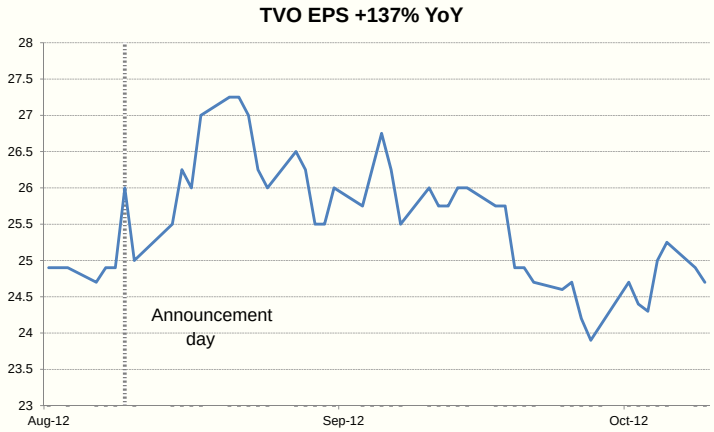

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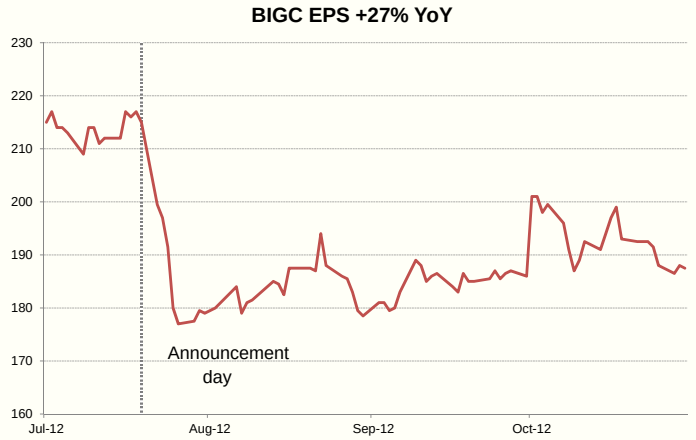

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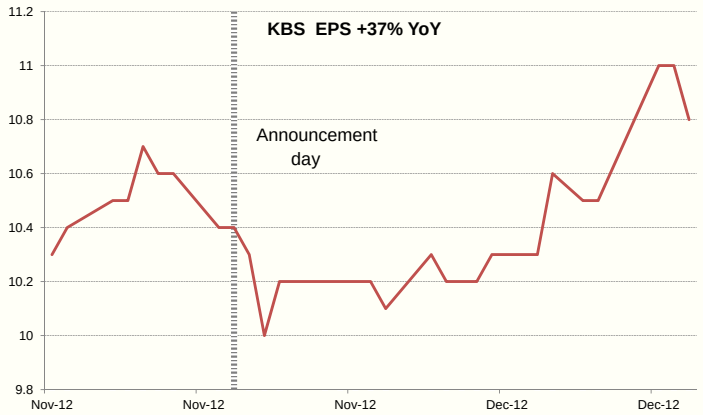

A Definition of Liquidity

A market is *liquid* if

uninformed traders can	(Who)
quickly	(Immediacy)
buy or sell	(Symmetry)
large size	(Depth)
when they want	(Availability)
at low transaction cost	(Spread)

Measuring Liquidity

- Quoted spread
- Price impact
- Depth
- Trading volume/Trading value
- Turnover
- Free float
- Frequency of trading
- Etc.

Price impact

- Thin (illiquid) markets results in larger price impact. What happens to market price when customer submits limit order of Rps 120 to buy 500 shares

Sell	Quantity
120	500
110	300
100	200

Price impact

- Deep (liquid) markets results in smaller price impact. What happens to market price when customer submits limit order to buy 500 shares at Rps 120?

Sell	Quantity
114	500
112	300
110	600
109	300
108	400

MSCI investable indices

2.2. Determining the Market Investable Equity Universes

A Market Investable Equity Universe for a market is derived by applying investability screens to individual companies and securities in the Equity Universe that are classified in that market. A market is equivalent to a single country, except in DM Europe, where all DM countries in Europe are aggregated into a single market for index construction purposes. Subsequently, individual DM Europe country indices within the MSCI Europe Index are derived from the constituents of the MSCI Europe Index under the Global Investable Market Indices methodology.

The investability screens used to determine the Investable Equity Universe in each market are:

- Equity Universe Minimum Size Requirement.
- Equity Universe Minimum Free Float-Adjusted Market Capitalization Requirement.
- DM and EM Minimum Liquidity Requirement.
- Global Minimum Foreign Inclusion Factor Requirement.
- Minimum Length of Trading Requirement.