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School of
ACCOUNTING
& FINANCE
會計及金融學院

Week 7: Introduction to Market Microstructure, Algorithmic Trading, and Direct Market Access

AF3214 Python Programming for Accounting and Finance

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School of Accounting and Finance
The Hong Kong Polytechnic University

R508, 8:30 am – 11:20 am, Wednesdays, Semester 2, AY 2024-25

Market Structure Analytics

- One of accounting and finance analytics is **market structure analytics**.
- The US Securities and Exchange Commission (SEC) created this website to promote better understanding of their equity markets and equity market structure through the use of data and analytics:
- https://www.sec.gov/marketstructure/market-structure-analytics

Market Structure Analytics

Overview

The Securities and Exchange Commission created this website to promote better understanding of our equity markets and equity market structure through the use of data and analytics.

Review current staff market structure research, use interactive data visualization tools to explore a variety of advanced market metrics produced from the Commission's Market Information Data and Analytics System (MIDAS), download dozens of datasets to perform your own analyses, and further the dialogue through public feedback.

Email Updates

Sign up to be notified when new data or analysis is added to this website.

Email Address | Submit

Data Visualizations

Create your own charts, compare and contrast data sets according to a variety of equity security characteristics, zoom to specific date periods, and view data distributions down to the level of one-millionth of a second.

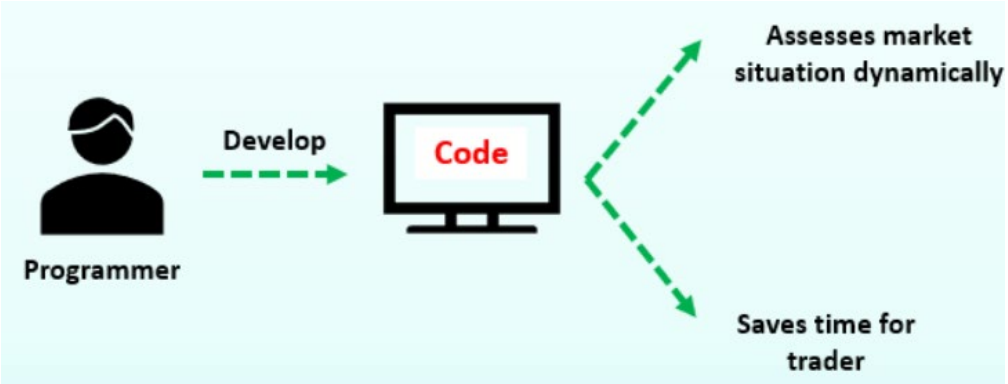
Launch Visualization Tool

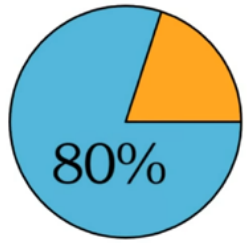
Research and Analysis

Read or download staff market structure research and analysis, including SEC staff Data Highlights and White Papers. Recent updates include:

- Staff Report on Algorithmic Trading in U.S. Capital Markets
  White Paper (pdf, 860 kb)
  August 5, 2020
- Study of Correlation Impact on Credit Default Swap Margin using a GARCH-DCC-copula Framework
  Research Note (pdf, 1 mb)
  November 13, 2019
- Does the Tick Size Affect Stock Prices? Evidence from the Tick Size Pilot Announcement of the Test Groups and the Control Group
  White Paper (pdf, 239 kb)
  November 9, 2018
- Empirical Analysis of Liquidity Demographics and Market Quality For Thinly-Traded NMS Stocks
  Research Note (pdf, 3.8 mb)
  April 10, 2018

Algorithmic Trading





Did you know…?

4 out of 5!

1. Bridgewater Associates (160B)
2. AQR Capital Management (80B)
3. Renaissance Technologies (80B)
5. Two Sigma Investments (50B)

- Algorithmic trading is an automated trading approach that uses computer algorithms to trade the markets.
- These algorithms create buy and sell orders and automatically send the orders to the market via the brokerage platform.
- *For a trading algorithm to place an order, the market conditions must match the predefined criteria.*

Examples of Simple Trading Algorithms:

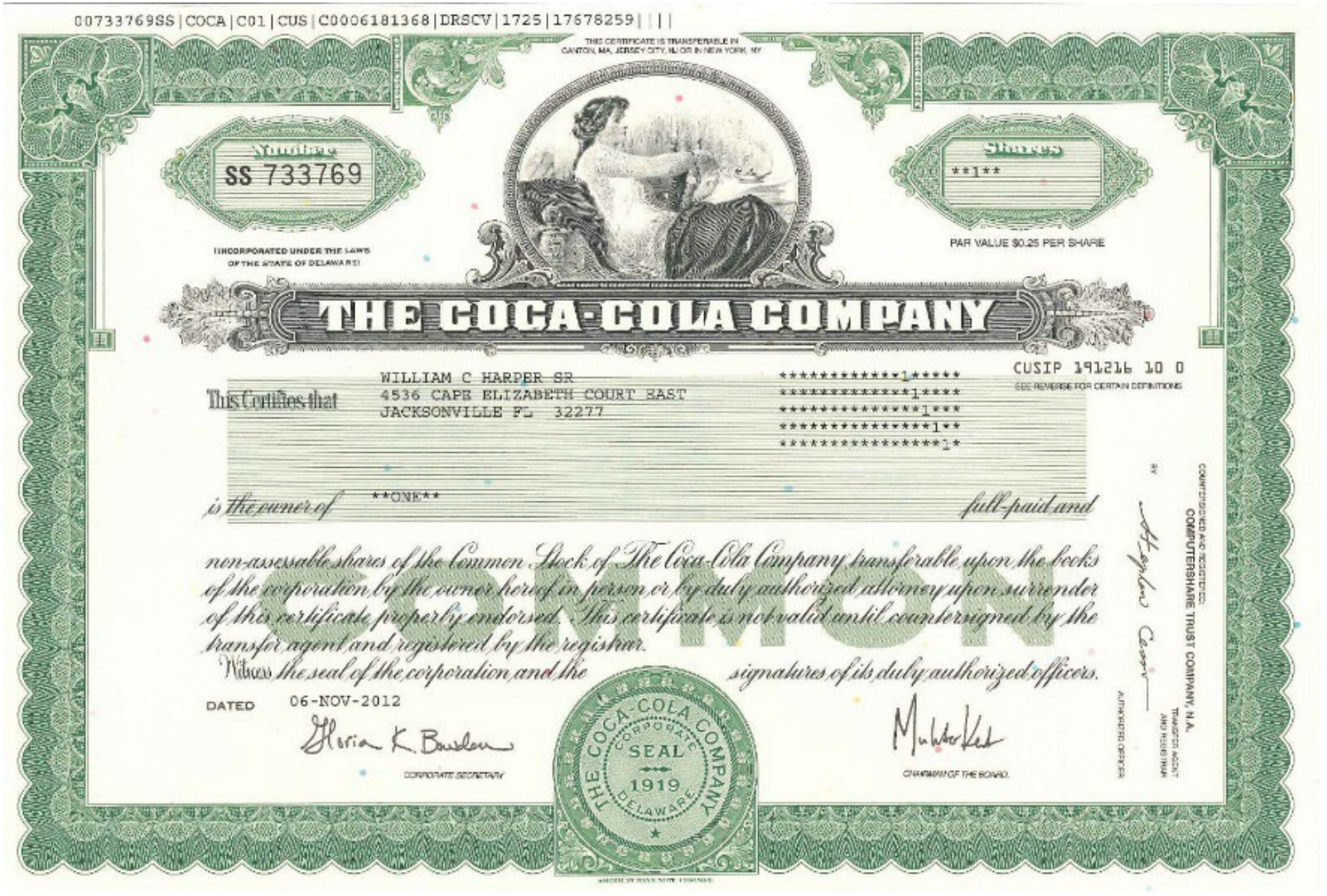
- Short 20 lots of GBP/USD if rises above 1.3610. For every 5 pip rise in GBP/USD, cover the short by 2 lots. For every 5 pip fall in GBP/USD, increase the short position by 1 lot.
- Buy 100,000 shares of Tencent (0700.HK) if the price falls below 400. For every 0.1% increase in price beyond 400, buy 1000 shares. For every 0.1% decrease in price below 400, sell 1000 shares.

World full of Assets

- Stocks
- Bonds
- Options
- FOREX
- Funds
- Cryptocurrencies
- …

Overview of the Asset Types

- **Stocks** – (also knowns as shares or equity) is a type of security that signifies proportionate ownership in the issuing corporation.
- It entitles the holders to that proportion of the corporation's assets and earnings.
- How does the stock market work: https://www.youtube.com/watch?v=p7HKvqRI_Bo



Overview of the Asset Types – Cont'd

- **Bonds** – A fixed income instrument that represents a loan made by an investor to a borrower.

What are bonds?

Anheuser - Busch, Incorporated

Video: https://www.rbcgam.com/en/ca/learn-plan/investment-basics/bond-basics/detail

Overview of the Asset Types – Cont'd

- **Options** – An agreement between a buyer and seller that gives the purchaser of the option the right to buy or sell a particular asset at a later date at an agreed price.

- Most often used in securities, commodities, and real estate transaction

DAL (DELTA AIR LINES, INC.)

Sep 10, 2020 @ 03:06 ET (Delayed) BID 31.76 ASK 31.9 VOL 19,362,682 LAST 31.75 CHANGE -0.78 (-2.46%)

Filters by:

Volume: All Expiration Type: All Options Range: All Expiration: 2020 December View Chain

Options Chain Total Records: 34

Calls

Last	Net	Bid	Ask	Vol	IV	Delta	Gamma	Int
26.37	0	28.25	29.45	0	2.6836	0.9914	0.0005	7
24.7	0	26.15	27.6	0	2.2416	0.9847	0.001	2
19.95	0	22.95	24.9	0	1.8269	0.9725	0.0021	2
19.9	0	21.7	22.85	0	1.3837	0.9748	0.0026	17
19.45	0	18.15	20	0	1.1755	0.9606	0.0044	46
14.65	0	16.95	18.1	0	1.0083	0.9539	0.0058	78
11.86	0	15.1	17.35	0	0.9744	0.9449	0.0069	18
14.75	0	14	16.7	0	1.079	0.9173	0.0085	138
12.15	0	13.5	15.3	0	0.9	0.9252	0.0094	59
13.6	0	12.05	14.9	0	0.8893	0.909	0.0111	51
12.65	0	11.35	13.4	0	0.8369	0.8985	0.0128	191
12.9	0	10.45	12.7	0	0.8248	0.8794	0.0146	210
10.36	0	9.95	11.9	0	0.7913	0.863	0.0167	368
11.2	0	8.85	11.45	0	0.7812	0.8393	0.0188	377
9.5	0	8.6	10.1	0	0.7535	0.818	0.0211	444
9.2	-0.375	7.5	8.6	8	0.7434	0.791	0.0232	1914
7.9	-0.975	6.95	9	1	0.7371	0.761	0.0253	1160
8.56	0	6.35	7.2	0	0.7264	0.7313	0.0273	965
6.5	-1.075	5.7	6.55	4	0.7125	0.7002	0.0293	11878
6.1	-0.925	5.8	6	11	0.7033	0.6668	0.0311	1360
5.4	-1.05	5.15	5.5	58	0.6998	0.6328	0.0324	4553
4.9	-1.05	4.75	4.95	24	0.6957	0.5984	0.0334	859
4.45	-1.025	4.4	4.5	6,519	0.6934	0.5641	0.0342	2780
4.07	-0.955	3.9	4.05	78	0.6862	0.5293	0.0349	598
3.6	-1	3.55	3.65	117	0.6875	0.4956	0.0349	618
3.26	-0.94	3.15	3.35	76	0.6844	0.4636	0.0349	3424
3.05	-0.8	2.86	2.99	119	0.6848	0.4325	0.0345	1088

12/18/2020

Strike
DAL 3.000
DAL 5.000
DAL 8.000
DAL 10.000
DAL 13.000
DAL 15.000
DAL 16.000
DAL 17.000
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DAL 32.000
DAL 33.000
DAL 34.000
DAL 35.000
DAL 36.000

Puts

Last	Net	Bid	Ask	Vol	IV	Delta	Gamma	Int
0.04	+0.01	0	0.08	20	2.001	-0.0028	0.0003	215
0.1	0	0.02	0.12	0	1.6885	-0.0057	0.0006	120
0.14	0	0.06	0.36	0	1.5314	-0.017	0.0017	300
0.2	-0.205	0.12	0.66	5	1.2686	-0.0191	0.0022	393
0.27	0	0	0.5	0	0.9654	-0.0217	0.0032	519
0.3	-0.085	0.3	0.41	1	0.9461	-0.0391	0.0054	11623
0.49	0	0.02	0.42	0	0.9164	-0.0477	0.0065	1130
0.65	0	0.08	0.47	0	0.8707	-0.055	0.0077	574
0.5	-0.105	0.1	0.58	52	0.8403	-0.0654	0.0091	2865
0.64	-0.065	0.34	0.59	5	0.8111	-0.0774	0.0108	724
0.69	-0.135	0.36	0.7	18	0.7856	-0.0918	0.0126	2333
0.91	-0.06	0.78	1.16	4	0.7645	-0.1087	0.0147	1684
1.03	-0.11	0.94	1.03	1	0.7485	-0.1286	0.0169	1376
1.18	-0.17	0.49	1.2	1	0.7325	-0.1506	0.0192	1281
1.4	-0.185	0.68	1.5	7	0.7194	-0.1757	0.0218	4035
1.63	-0.21	1.58	1.74	25	0.7096	-0.2031	0.024	4050
1.92	-0.22	1.15	2.23	417	0.7014	-0.2333	0.0262	1469
2.24	-0.24	2.15	2.78	79	0.6922	-0.2646	0.0284	737
2.69	-0.145	2.46	2.7	22	0.6856	-0.2977	0.0304	1035
3.1	-0.15	3	3.15	24	0.6802	-0.3323	0.0321	184
3.78	0	3.5	3.6	0	0.6741	-0.3676	0.0336	2491
4.02	-0.18	3.95	4.1	24	0.6704	-0.4034	0.0347	158
4.55	-0.15	4.5	4.85	13	0.6691	-0.4387	0.0354	750
5.15	-0.1	5.15	5.25	15	0.661	-0.4756	0.0363	313
5.8	-0.05	5.75	5.9	31	0.6582	-0.5099	0.0364	317
6.45	-0.025	6.4	6.6	387	0.6551	-0.5449	0.0364	907
7.18	0	7.05	7.25	0	0.6584	-0.5755	0.0358	71

Overview of the Asset Types – Cont'd

- **FOREX** – Known as foreign exchange or currency trading is a decentralized global market where all the world's currencies trade.
- It is the most liquid market in the world with an average daily trading volume exceeding $5 trillion.
- Active 24/7 due to different time zones.

Overview of the Asset Types – Cont'd

- **Cryptocurrencies** – A cryptocurrency is a digital asset designed to work as a medium of exchange.
- Become increasingly popular.
- They are different from currencies because they are decentralized assets currently not regulated or controlled by any one country, central bank, or regulatory authority. Except for El Salvador.
- Examples: https://coinmarketcap.com/all/views/all/

Cryptocurrencies ▾ | Exchanges ▾ | Watchlist | Filters | USD ▾ | ← Back to Top 100

Rank	Name	Symbol	Market Cap	Price	Circulating Supply	Volume(24h)	% 1h	% 24h	% 7d
1	Bitcoin	BTC	$824,380,468,372	$43,794.51	18,823,831 BTC	$37,131,821,545	-1.02%	3.31%	-8.67%
2	Ethereum	ETH	$364,800,778,352	$3,100.99	117,640,254 ETH	$22,013,777,385	-1.17%	5.27%	-14.10%
3	Cardano	ADA	$71,288,452,197	$2.23	32,038,100,544 ADA	$4,504,936,231	-0.97%	4.08%	-10.22%
4	Tether	USDT	$68,732,191,459	$1.00	68,669,605,856 USDT *	$77,836,188,754	-0.03%	0.06%	0.05%
5	Binance Coin	BNB	$63,154,605,018	$375.61	168,137,036 BNB *	$1,645,728,881	-0.89%	3.41%	-11.78%
6	XRP	XRP	$46,238,544,096	$0.9897	46,717,640,571 XRP *	$4,558,487,374	-1.24%	5.08%	-10.95%
7	Solana	SOL	$43,705,053,219	$147.08	297,144,795 SOL *	$4,631,761,887	-1.43%	10.89%	-7.79%
8	Polkadot	DOT	$30,758,615,816	$31.15	987,579,315 DOT *	$2,618,639,991	-1.42%	8.09%	-12.80%
9	USD Coin	USDC	$30,190,688,917	$1.00	30,179,216,737 USDC *	$3,534,372,385	-0.04%	0.02%	0.03%
10	Dogecoin	DOGE	$29,190,453,450	$0.2221	131,405,897,241 DOGE	$1,675,746,018	-1.30%	5.25%	-8.68%

The Market Players

- **Exchanges** – An exchange is an institution, organization, or association which hosts a market where stocks, bonds, options, futures, and commodities are traded.
- They are places dedicated to trading.
- They impose rules and regulations on the firms and brokers involved in them.
- How the NYSE Works: https://www.youtube.com/watch?v=XRJBZIQrQAY

Largest stock exchanges? NYSE, NASDAQ, Tokyo, Shanghai, Euronext, Hong Kong, London, Shenzhen…

The Market Players – Cont'd

- **Broker** or **Dealer** – is a person or firm in the business of *buying* and *selling* securities for its own account or on behalf of is customers.
- A brokerage acts as a broker when it execute orders on behalf of its clients.
- A dealer or principal – Trades for its own account.

The Market Players – Cont'd

"Sell-Side" – brokers and dealers that facilitate the issuance and selling of assets

"Buy-side" – Institutional/individual investors that purchase stocks, securities, and other financial products for their company or clients.

Brief History of Electronic Trading

- In the 1960s, computer networks were used to route prices to computer terminals.
- Most orders were still carried out over the phone or in person on exchanges.
- By the mid 1990s, many of the world's major stock exchanges were trading a considerable proportion of their volume electronically.
- The bond market has been slower to adopt electronic trading, due to them being centered more on market makers rather than exchanges.
- Overall, electronic trading has made the world markets accessible to a much wider range of users. Without this innovation, algorithmic trading, DMA, and automated crossing would not exist.

Year	*Event*
1969	Instinet's "Institutional Networks" started, allowing electronic block-trading.
1971	NASDAQ electronic bulletin board started, allowing OTC trading of stocks.
1972	Cantor establish first electronic marketplace for U.S. Government securities.
1976	NYSE's Designated Order Turnaround (DOT) system routes small orders.
1978	U.S. Intermarket Trading System (ITS) established, providing an electronic link between NYSE and the other U.S. stock exchanges.
1980	Instinet introduces PSE Scorex, enabling DMA to U.S. exchanges.
1981	Reuters pioneered electronic monitor dealing service for FX.
1982	Tokyo Stock Exchange introduces its Computer-assisted Order Routing & Execution System (CORES).
1986	London Stock Exchange's "The Big Bang" shifts to screen trading. Paris Bourse introduced an electronic trading system.
1987	ITG POSIT offers scheduled block crossings for stocks.
1988	MTS platform created electronic secondary market for Italian government bonds.
1992	CME launches first version of GLOBEX electronic futures platform.
1993	EBS (Electronic Brokers System) adds competition for spot FX.
1997	U.S. SEC order handling rules change results in the creation of Arca, Brut, Island and Bloomberg Tradebook ECNs.
1998	Eurex offers the first fully electronic exchange for futures.
1999	EuroMTS launched for European government bond trading. eSpeed available for client bond trading.
2000	ICAP's BrokerTec bond trading platform launches.
2001	Liquidnet ATS created, allowing "dark pool" buy-side crossing for equities.
2006	NYSE starts moving equity trading to its Hybrid platform.
2007	U.S. Regulation NMS, European MiFID regulations come in force.

Table 1-1 Some of the key milestones in the adoption of electronic trading

Johnson, B.W. (2010). Algorithmic trading & DMA : an introduction to direct access trading strategies.

The Trading Process

trade flow from the point of view of an investor

1. Buy-side initiated trade is placed as an order with a broker.
2. The broker will communicate the order to a trader/dealer.
3. The trader would then either quote a price to trade against their own inventory or alternatively work the order on an exchange.

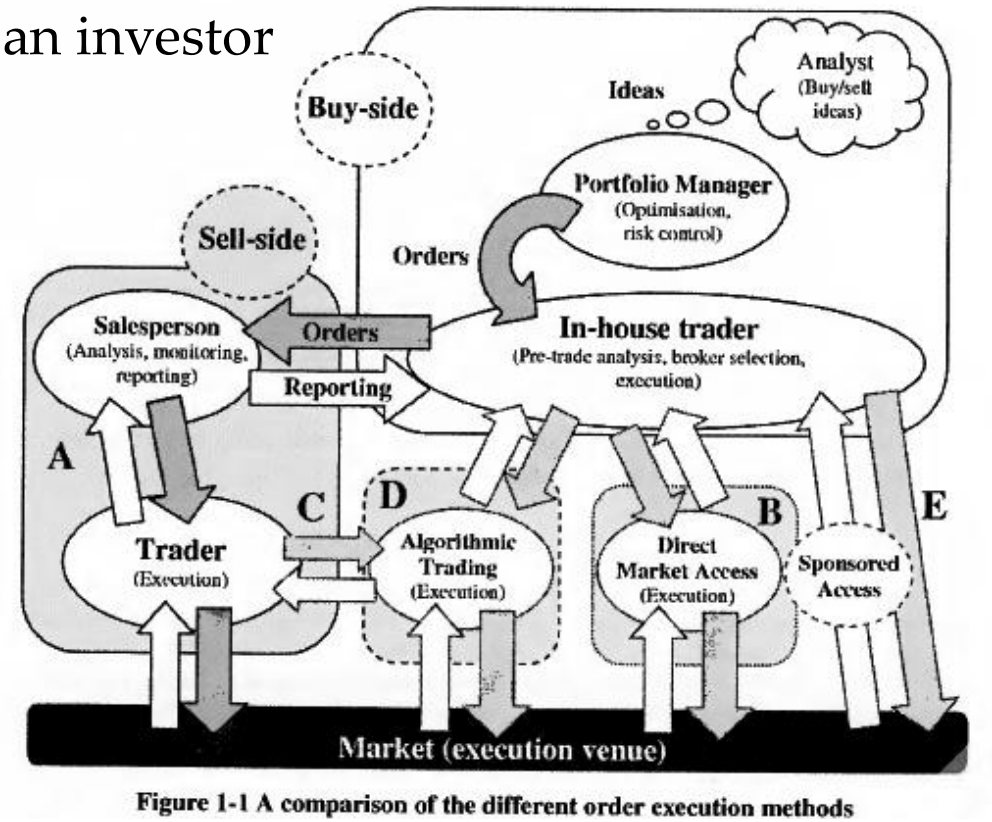


Figure 1-1 A comparison of the different order execution methods

- Nowadays, electronic trading has predominantly taken over this whole process.
- Wall Street Traders Were VERY Intense in 1980: https://www.youtube.com/watch?v=8e1g-0n8iGo

The Trading Process – Cont'd

- **Direct Market Access (DMA)** is where brokers allow clients access to their order routing infrastructure.
- This allows the buy-side to issue their electronic orders almost directly to the exchanges, effectively giving them much the same level of control over an order's execution as a sell-side trader has.

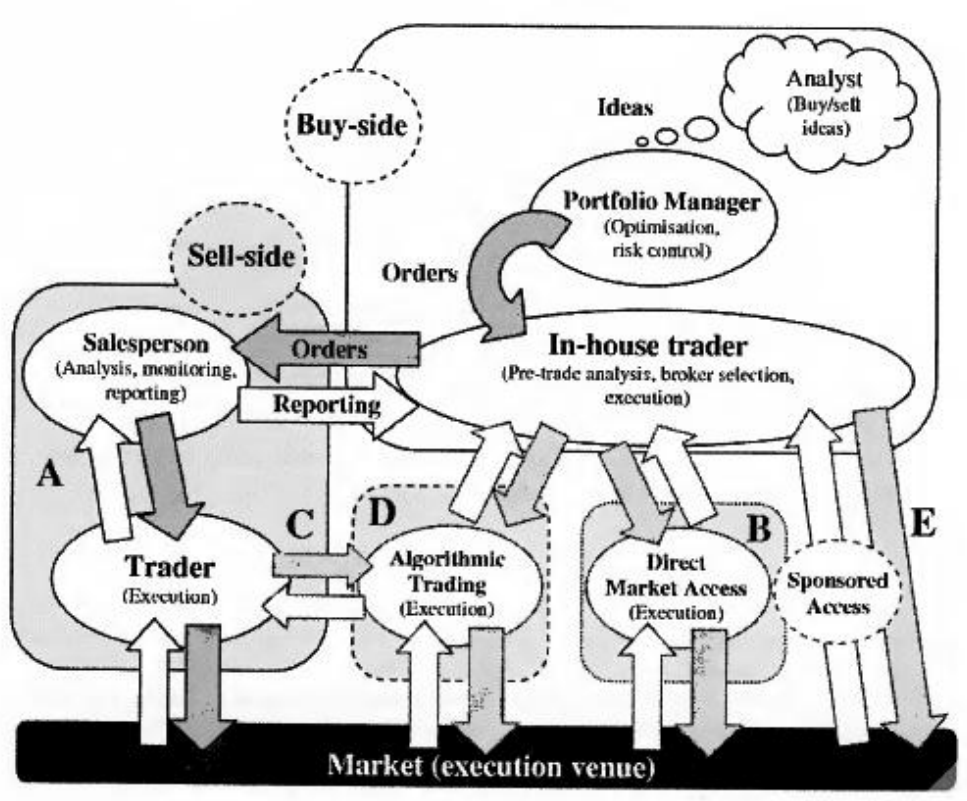


Figure 1-1 A comparison of the different order execution methods

The Trading Process – Cont'd

- **Sponsored Access** takes this to the next level, for clients whose high-frequency trading strategies need ultra-low latency connections.
- Essentially, this allows clients to connect directly to the market

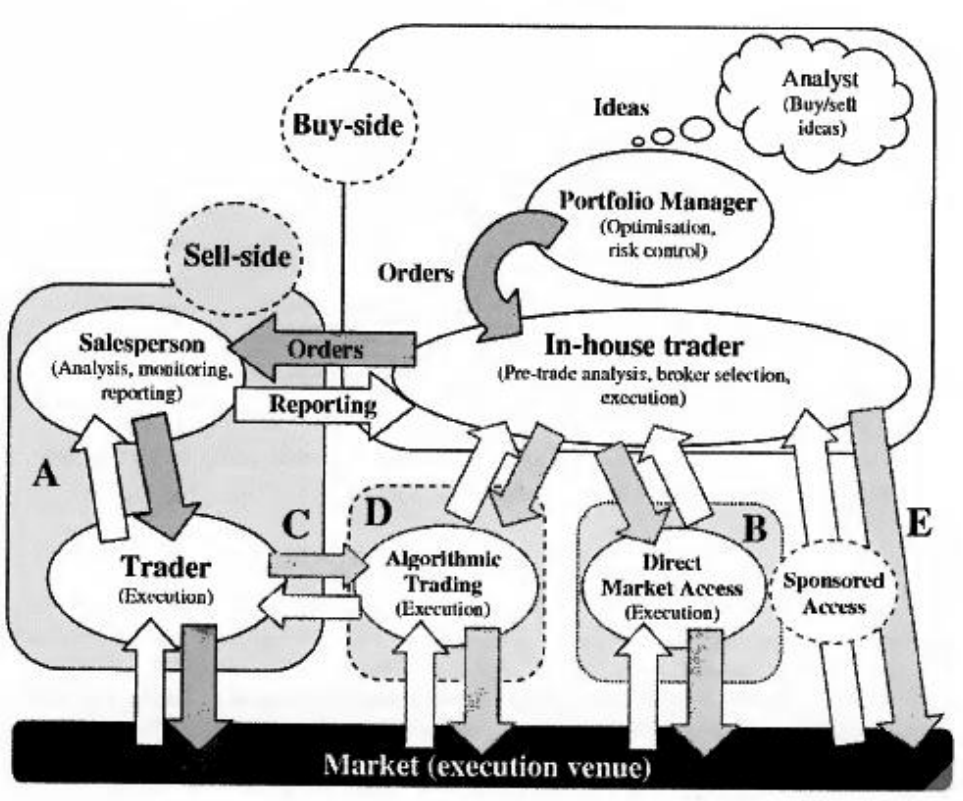


Figure 1-1 A comparison of the different order execution methods

Algorithmic Trading

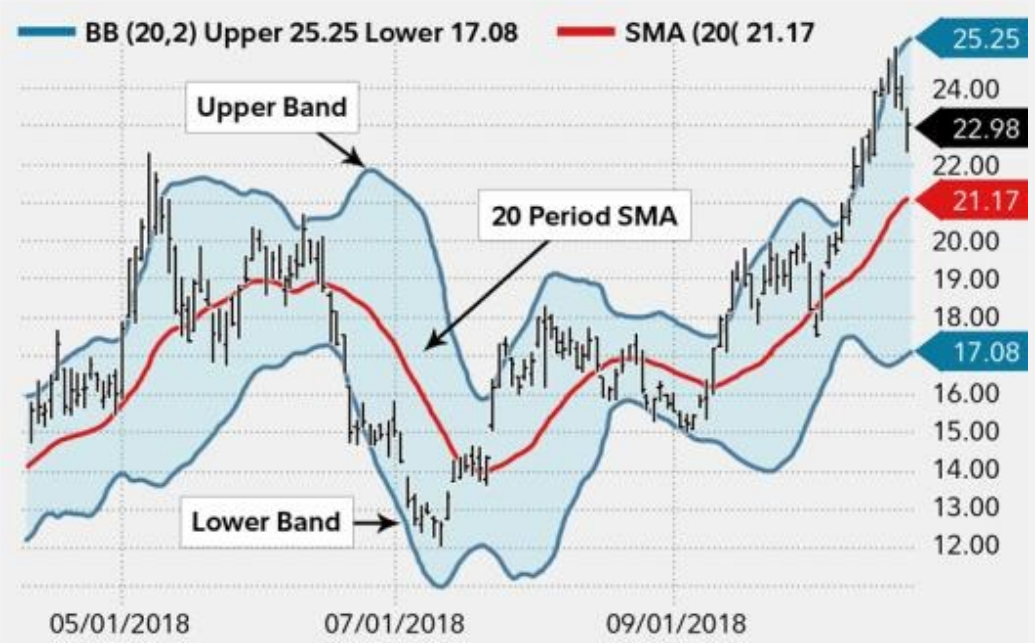
- A computerized system is responsible for executing the order to buy or sell a given asset, rather than being worked manually by a trader.
- A computer program follows preset to determine how each order should be executed.
- Both Algorithmic Trading and DMA allow clients access to trade on markets known as Direct Access Trading.
- https://www.youtube.com/watch?v=2u007Msq1qo

Institutional Trading Types

- **Portfolio Trading** – Referred to as basket or program trading. Provides investors with cost effective means of trading multiple assets, rather than having to trade them individually.
- An ETF is an example of a basket of securities that trade on an exchange just like a stock.
- ETF are a collection of stocks or securities that track an underlying index.

Institutional Trading Types – Cont'd

- **Systematic Trading** – Adopting the same approach for trading. Such as dictating points for trade entry and exit.
- An example would be comparing market prices with boundary conditions.
- Can require an intricate set of rules, which accommodate a wide range of intraday conditions such as price, volume, or volatility.



Forms of Systematic Trading

- **Quantitative Trading** – Sometimes referred to as "Blackbox" trading.
- Trading rules are enforced by adopting proprietary quantitative models.
- Strategies can range from tracking indicators to determine trade initiation and close out, to monitoring the overall portfolio risk.

Forms of Systematic Trading – Cont'd

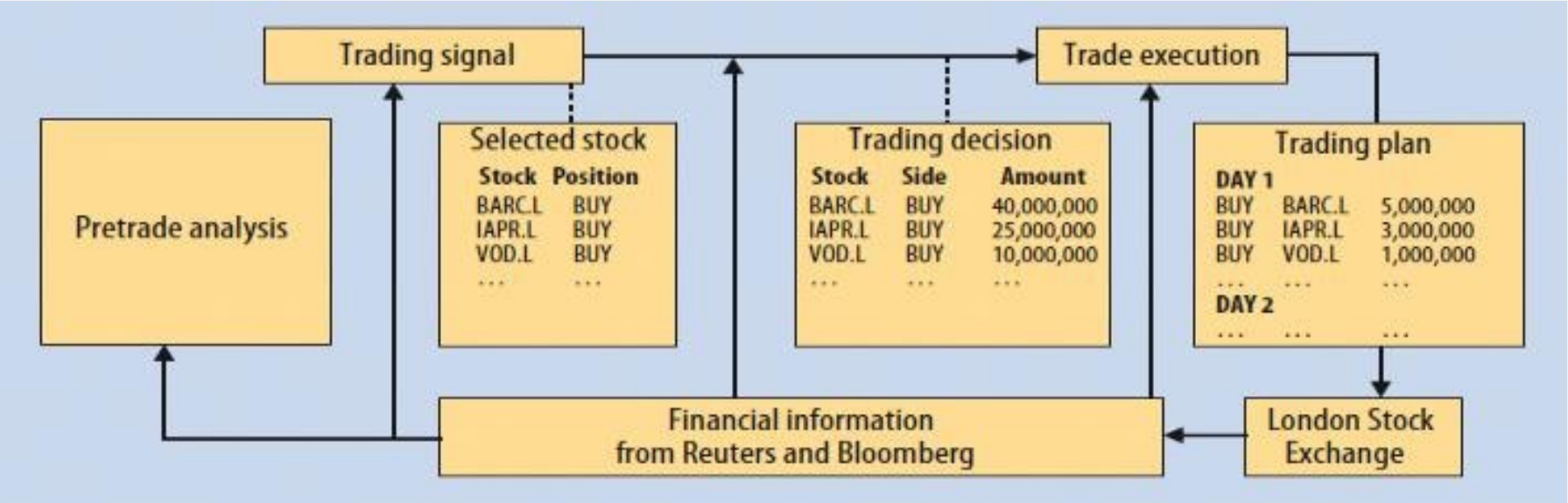
- **High frequency trading** – Aims to take advantage of opportunities intraday.
- The time scales involved range from hours down to seconds or even fractions of a second.
- A specialized form of Blackbox/quantitative trading focused on exploiting short-term gains.
- High frequency traders adopt a similar style to market maker, where they keep a neutral position except to take advantage of any price discrepancies.

Forms of Systematic Trading – Cont'd

- **Statistical arbitrage** – represents a systematic investment/trading approach, which is based on a combination of real time and historical data analysis.
- The main difference from high frequency trading is that strategies may span over longer timeframes.
- The goals are similar, both try to take advantage of mispricing whilst minimizing the overall exposure to risk.
- Strategies try to find trends or indicators from previous data and then use these to gain an edge.
- Time series analysis, data mining, and artificial intelligence are employed to isolate useful information from the mass of data that available.

ALGORITHMIC TRADING

Deep Dive into Algorithmic Trading



- An algorithm is a set of instructions for accomplishing a given task, therefore a trading algorithm is just a computerized model that incorporates the steps required to trade an order in a specific way.
- Due to the nature of trading algorithms and their need to constantly react to ever changing market conditions these rules can become quite complex.

Deep Dive into Algorithmic Trading

- An example of a simple trading algorithm is **a slicing strategy**, where a big order is broken up and a certain amount is traded during certain periods to achieve a certain average price.
- Modern trading algorithms have evolved from this simplistic order slicing strategy to the point where their trading patterns are unrecognizable.
- They are designed to target the best execution, given the specified objectives.

Evolution of Trading algorithms

- Early on trading algorithms were natural evolutions of **simple order slicing**.
- Their main focus was on meeting specific benchmarks, starting with a Time Weighted Average Price (TWAP) and progressing on to Volume Weighted Average Price (VWAP).
- Both the early on TWAP and VWAP algorithms were statically driving. Therefore once an order was received, a specific trading schedule was determined, which then drive the trading algorithm.
- Using these statically created schedules proved vulnerable, because market participants could easily spot and take advantage of a regular trading pattern.

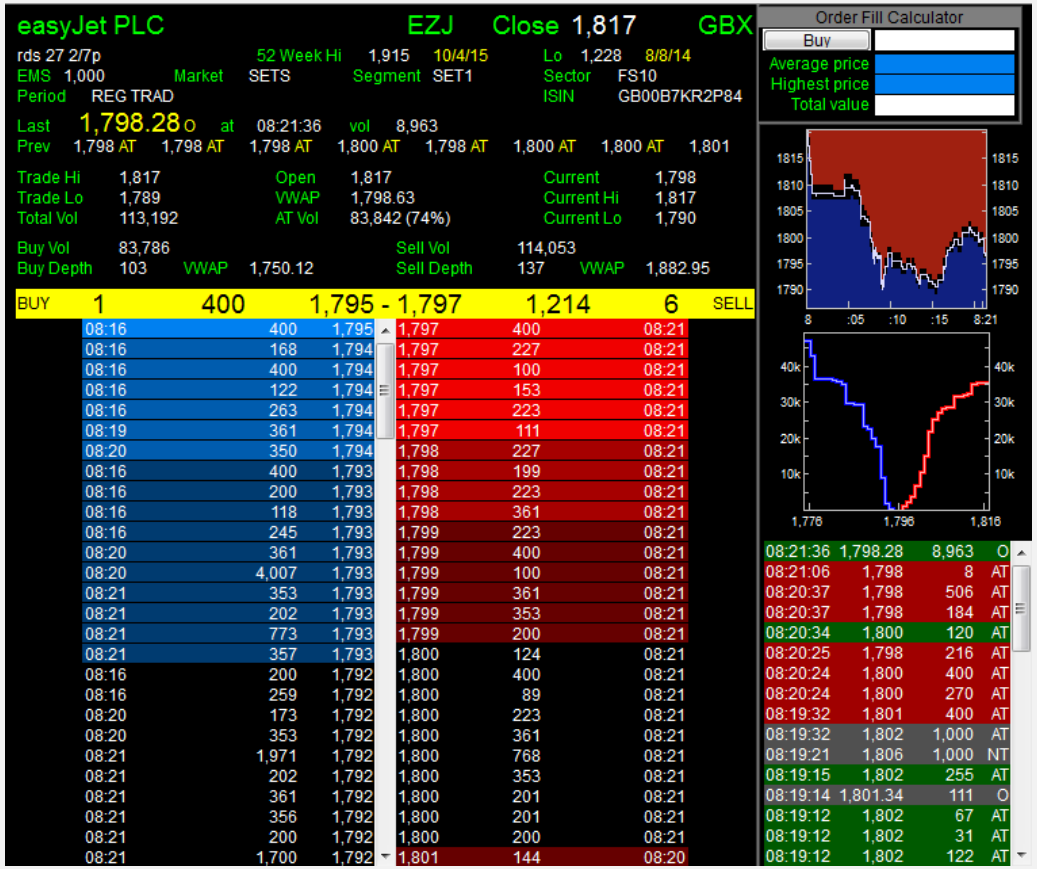
Evolution of Trading Algorithms – Cont'd

- The second generation of trading algorithms were created in response to the application of **transaction cost analysis**.
- Transaction cost analysis breaks down all the various costs associated with trading.
- It highlighted that the effect an order has on the asset's price was not the only significant cost.
- Other factors, such as timing risk and opportunity costs, could actually outweigh the market impact.
- The first generation of algorithms were not designed to be price or risk sensitive; they were just simply focused on reducing overall market impact.

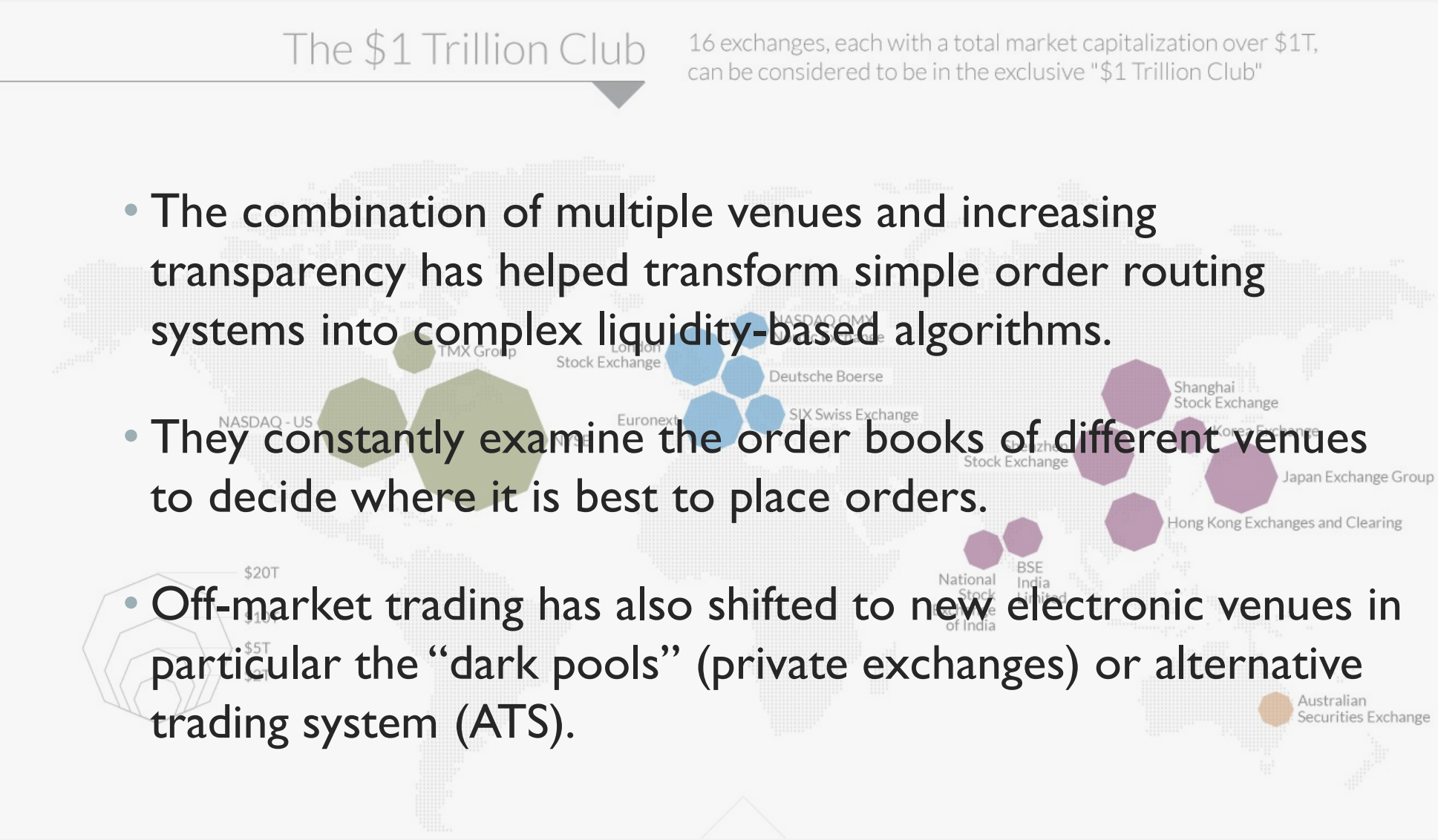
Evolution of Trading Algorithms – Cont'd

- The third generation of algorithms have resulted from the ongoing search for liquidity triggered by rapid proliferation of **electronic crossing networks and alternative trading systems**.

- Electronic crossing network is an alternative trading system that matches buy and sell orders electronically for execution without first routing the order to an exchange or other displayed market.



Evolution of Trading Algorithms – Cont'd



- The combination of multiple venues and increasing transparency has helped transform simple order routing systems into complex liquidity-based algorithms.
- They constantly examine the order books of different venues to decide where it is best to place orders.
- Off-market trading has also shifted to new electronic venues in particular the "dark pools" (private exchanges) or alternative trading system (ATS).

DIRECT ACCESS TRADING

Direct Access Trading

- Represents the shift in access and control of execution to the buy-side.
- Investors and buy-side traders can now get direct access allowing them to place orders on many of the worlds' financial marketplaces.
- Direct access trading was synonymous with DMA, but with crossing and algorithmic trading, institutions now have a broader choice of execution methods.

Direct Access Trading – Cont'd

- Direct Market Access extends the principle of remote access to a broker's clients.
- It has been present since the 1980s.
- With DMA, the client can take advantage of the broker's infrastructure to send their orders to the exchange.
- A key concern is leaking of information; therefore DMA services are run by brokers as a separate entity to protect client orders.

Sponsored Access

- Sponsored access caters for buy-side clients with high-frequency trading strategies.
- Markets usually require the broker to monitor the trading, ensuring that no excessive risks are taken.
- Monitoring can be carried out pre-trade, either with a fast, dedicated system, or by using a solution. This adds some overhead.
- Naked Access is when monitoring is done post trade. This does not allow the broker to prevent erroneous trading.

Crossing

- Institutions often need to trade in large sizes, but large block orders can expose them to price risk
- In the past, the large orders would have been handled by brokers off the trading floor.
- “Upstairs Market”, since these negotiations took place upstairs in broker’s offices, away from the exchange floor.
- Crossing systems provide an electronic mechanism allowing investors to carry out their own block trading anonymously.

Crossing – Cont'd

- These system aggregate orders and then match them at set points throughout the day.
- These anonymous trading venues ensure that order details are hidden, hence they have often been referred to as “dark pools” of liquidity.
- They offer the buy-side the chance to cut out the broker as an intermediary and trade anonymously with each other.
- Orders using crossing systems or Alternative Trading System (ATS) are not guaranteed to execute; the focus is on achieving a better price and minimizing information leakage.

Direct Liquidity Access

- Managing an order on a crossing network or ATS is essentially the same as DMA, therefore vendors now offer solutions that enable access to both mechanisms.

- **Direct Liquidity Access** does not only just combine DMA and crossing, but also includes features such as liquidity aggregation, where smart order routing or custom trading algorithms are used to seek out sufficient liquidity at the desired price.

Manual Trading

- There are still perks to manual trading.
- It allows the client to discuss the order with the broker.
- It gives them an opportunity to gain new market information and analysis.

MARKET MICROSTRUCTURE

What is it?

- Market microstructure is a branch of finance concerned with details of how exchange occurs in the markets.
- It focuses on the key mechanisms involved in trading and helps explain many of the costs.

What is it? – Cont'd

MARKET STRUCTURE
AND DESIGN

TRADING MECHANISM
RESEARCH

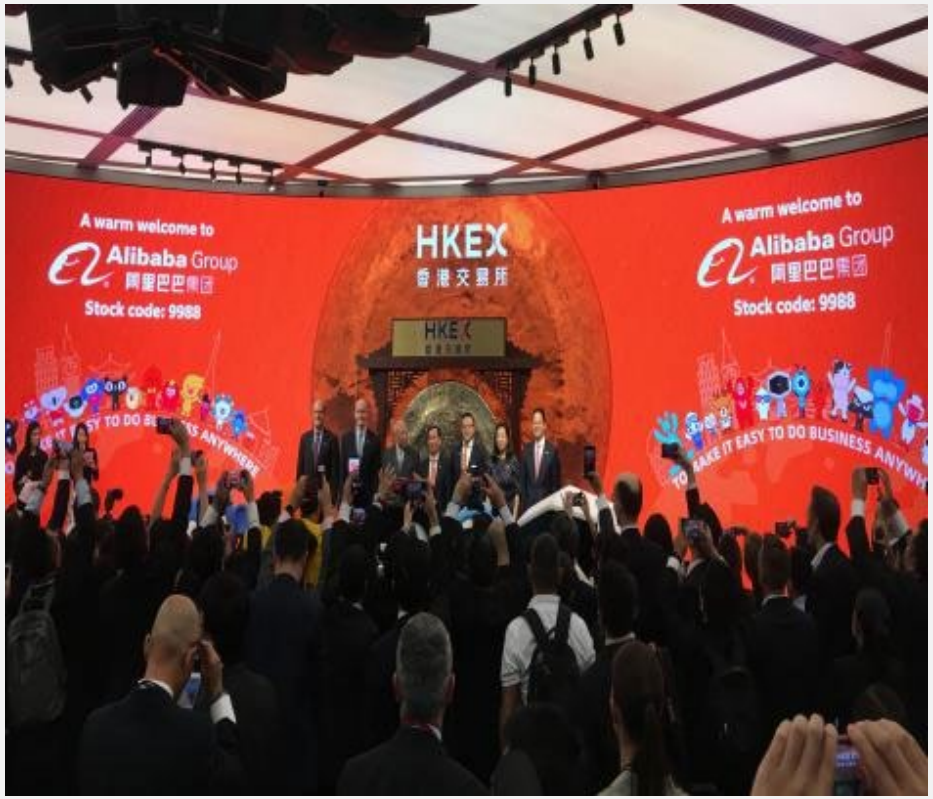
TRANSACTION COST
MEASUREMENT AND ANALYSIS

The Fundamentals

- The purpose of a market is to bring buyers and sellers together.
- Capital markets may be categorized into primary and secondary markets.
- Primary market deals with issuance of new assets/securities.
- The secondary market is the subsequent trading of these assets.

Primary Market

- Government bonds issued via specialized auctions
- Initial Public Offerings (IPOs), follow-up offerings, and so on.
- Corporate Debt (Bonds) is generally placed using underwriters.

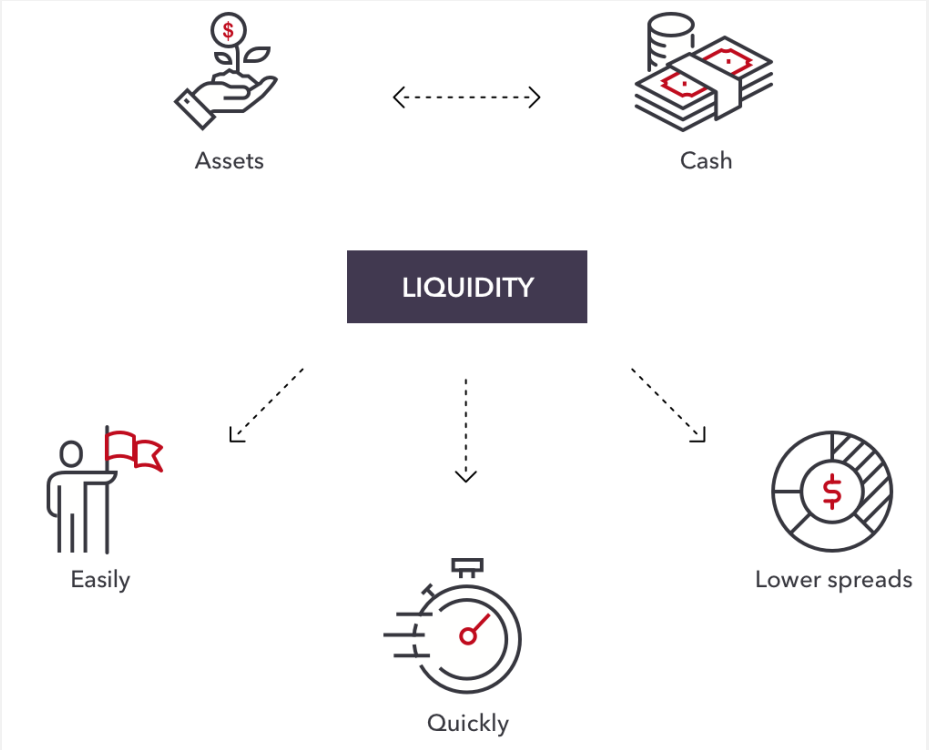


Secondary Market

- Secondary markets are important because investors will be more willing to provide capital if they know the assets may readily be traded.
- The flexibility allows them to withdraw capital when needed and to switch between assets.
- Therefore the one of the main focuses of market microstructure is the efficiency of the secondary markets.

Liquidity

- Liquidity is a vital aspect of trading.
- A liquid market or asset should have lower cost for immediacy, i.e. trading costs.
- More liquid markets or assets will also usually have higher trading volumes.
- The stock market is generally more liquid than the real estate market.
- Characteristics of market liquidity can be characterized in terms of three main features
  - Depth
  - Tightness
  - Resilience

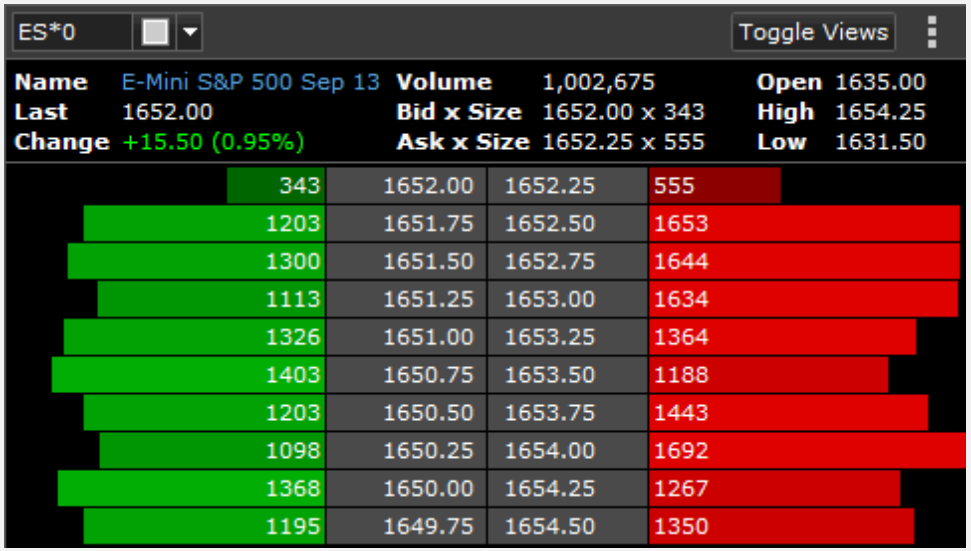


Liquidity – Cont'd

- Depth – indicates the total quantity of buy and sell orders that are available for the asset around the equilibrium price. Thus a deep market enables us to trade large volumes without causing sizable price movements.

- Tightness – bid offer spread. The difference between the prices to buy and sell an asset.

- Resilience – How quickly the market recovers from a shock. A resilient market will suffer less price discrepancies from trading. So changes in price do not affect the overall level of trading or availability of orders.



MARKET STRUCTURE AND DESIGN

Key Characteristics

Market Type

Order Types

Trading Protocols

Transparency

Off-market trading

Types of Markets

- Two most important properties for classifying markets are the following.
  - Trading Mechanism
  - Trading Frequency

Trading Mechanism

- Markets are generally thought of as being either quote driven, order-driven, or a mix.
- A purely **quote-driven market** means traders must transact with a dealer/market maker who quotes prices at which they will buy and sell a given quantity.
- **Order driven markets** allow all traders to participate equally, which means placing orders on an order book that are then matched using a set of rules.

Examples of Quote Driven Market

Bonds

Currencies

Commodities

Order Driven Market

- Prices are established by an actual order.
- The best bid price represents the highest priced buy order.
- The best offer is set by the lowest priced sell order.
- A trade may only occur when a buy order matches the current best offer price.
- Key difference is that instead of reacting to the market maker's two-way quote, we react to the available liquidity on the order book.

Benefits of Order Driven Markets

- Persistence of orders within order-driven system provides visible liquidity.
- Offer more control over order choice.
- Order may be placed for any preferred price and size without the need for negotiation.

Trading Frequency

- The determinant of when requirements are turned into executions.
  - Continuous trading – Leads to price volatility.
  - Periodic Trading - Scheduled for specific time/s in the day.
  - Request-driven trading – Requesting a quote from a market maker, but not the most efficient in terms of the price achieved.

Order Types

- Order is simply an instruction to buy or sell a specific quantity of a given asset.
- Two main types
  - Market Orders – Trade immediately at the best price available.
  - Limit Orders – Have an inbuilt price limit that must not be breached, a maximum price for buys and a minimum price for sells.

The End