

## **SECURITY MARKETS**

*Security Markets* are places where traders gather to trade securities (eg. LIFFE or Forex Market). *Trading* is a search process, where buyers or sellers try to find a counter-party. Price, quantity and time to the trade are key factors. *Dealers* or *brokers* help people trade. Dealers are willing to take the other side of a trade on demand. They quote a bid (buy) price and a offer (ask) price and profit from the spread. Dealers acquire their clients' positions and then try to trade for them at a profit. Brokers are agents who help traders search for counter parties; they profit through commissions. Security markets are designed to reduce counter-party search cost. Key elements which make markets work are: asymmetric information between informed and uninformed traders; order flow externalities "trade attracts trade!"; trading rules; communication and trading technology; arbitrage between assets in different markets; principal-agent issues<sup>1</sup>; trustworthiness and creditworthiness; and the legal and institutional framework.

## **CHARACTERISTICS OF FINANCIAL MARKET MICROSTRUCTURE**

Three main characteristics define the financial market structure (cf. Figure A.3): a. trading sessions (time intervals at which trades take place), b. execution systems (matches buyers with sellers), and c. information systems (bring information into and out of the market).

a. *Trading sessions* differ across different types of markets. *Continuous markets* arrange trades continuously as orders arrive. *Call markets* collect orders for *batch* processing.

b. Markets are usually classified by their *execution systems* (the procedures for matching buyers and sellers), these include:

- *quote-driven systems*: are primarily organised by dealers (e.g. NASDAQ, London International Stock Exchange (SEAO), OTC Bond markets, Forex markets). In a pure quote-driven markets, dealers supply all liquidity. Dealers quote their *bid* and *ask* prices. Better prices and larger quotes for larger sizes may be obtained through negotiation. Brokers or buy-side traders choose which dealer they trade with. Narrow spreads provide a measure of fairness;
- *order-driven systems (auction markets)*: are organised by exchanges and follows order precedence trading rules to match buyers and sellers and a set of *pricing rules* to

---

<sup>1</sup> Agents may not act in the best interests of the principal; brokers may not work as hard as you may want them to etc

determine the trade prices (e.g. Tokyo Stock Exchange; Paris Bourse; Toronto Stock Exchange). Since traders cannot choose with whom they trade, order-driven markets require *clearing houses*;

- *brokered systems*: are organised by brokers who actively search for matching buyers and seller. Brokered markets usually arise when the item traded is somehow unique and when dealers are unwilling to hold inventories. Brokered market examples include block trading market, market for ongoing concerns (businesses) and real estate market;
- *hybrid systems*: are a mixture of order driven, quote driven and brokered market. Hybrid systems are order-driven auction markets in which the specialist must provide liquidity under some circumstances. Many US stock and options exchanges have specialist systems.

c. Information Systems collect, organize, present, store, and transmit information about orders, quotes and trades. Electronic trading systems facilitate collection of information from market participant. *Order routing systems*, *order presentation systems*, and *order books* are used to transmit, present, and manage standing orders. Electronic order routing systems transmit standardised orders with great accuracy at low cost. These systems may be maintained by brokers, dealers or exchanges. Complex orders are often communicated by telephone. On some exchanges, hand signals may be used to send an order from an order clerk to a floor trader. An example of Order Routing System is NYSE's SuperDot. In *open outcry auctions (oral auctions)*, traders sell out their bids and offers on the floor of an exchange. In *screen-based trading systems*, orders are presented on computer screens. In *board-based trading systems*, orders are written on a big board. Order books hold orders that have not yet been executed. An order book may be an electronic database or a box of trading tickets. Brokers, exchanges and dealers may all maintain order books.

Collected information is distributed to member traders. *Market data systems* report trades and quotes to the public. *Price and sale feeds (ticker tapes)* report trade prices and sizes. *Quotation feeds* report quotation changes. The Securities Industry Automation Corporation (SIAC) maintains the Consolidated Trade and Quotation System (CTS and CQS). Trade information is sold to various data vendors who repackage it for distribution to the public.

A market is *transparent* when complete information is reported to the public quickly. A market is *liquid* when traders can trade when they want to without much impact on price.

Orders are instructions traders give to brokers and/or exchanges explaining how their trades should be arranged. Traders use orders to communicate their intentions. An exchange

arranges trades by applying rules for matching orders. The order submission strategy affects trading profits and liquidity. Different types of order can be issued, these affect market liquidity and execution price:

*market orders*: instruct the brokers to trade at the best price currently available;

*limit orders*: instruct the broker to trade at the best price available but to not violate the limit price;

*stop orders*: activate only after price reaches some threshold called stop price;

*market if touched orders*: are traded at the market price if it touches some preset price;

*tick sensitive orders*: specify tick<sup>2</sup> conditions for trade execution.

Different type of instruction can be associated with an order:

- *Validity Instructions* indicate how long the order remains (*Good-till-cancel* orders remain open indefinitely; *Good-until* orders specify an expiration date; *Day orders* expire at day-end; *Immediate-or-cancel*, *good-on-sight* orders and *fill-or-kill* orders expire immediately following presentation)
- *Quantity instructions* indicate how large orders can be broken into small trades. *All-or-none* orders must be completely filled.
- *Timing instructions* restrict the execution window (*Market-on-close* orders are traded at closing prices; *Market-on-open* orders are traded on open prices)
- *Execution instructions* tell the broker how to arrange the trade (*Market-not-held* is a market order that the broker need not immediately execute or expose. The broker is expected to use discretion to find the best price).

---

<sup>2</sup> A *tick* is a change in price between trades. An *up-tick* is an increase in price; *down-tick* is a decrease in price.

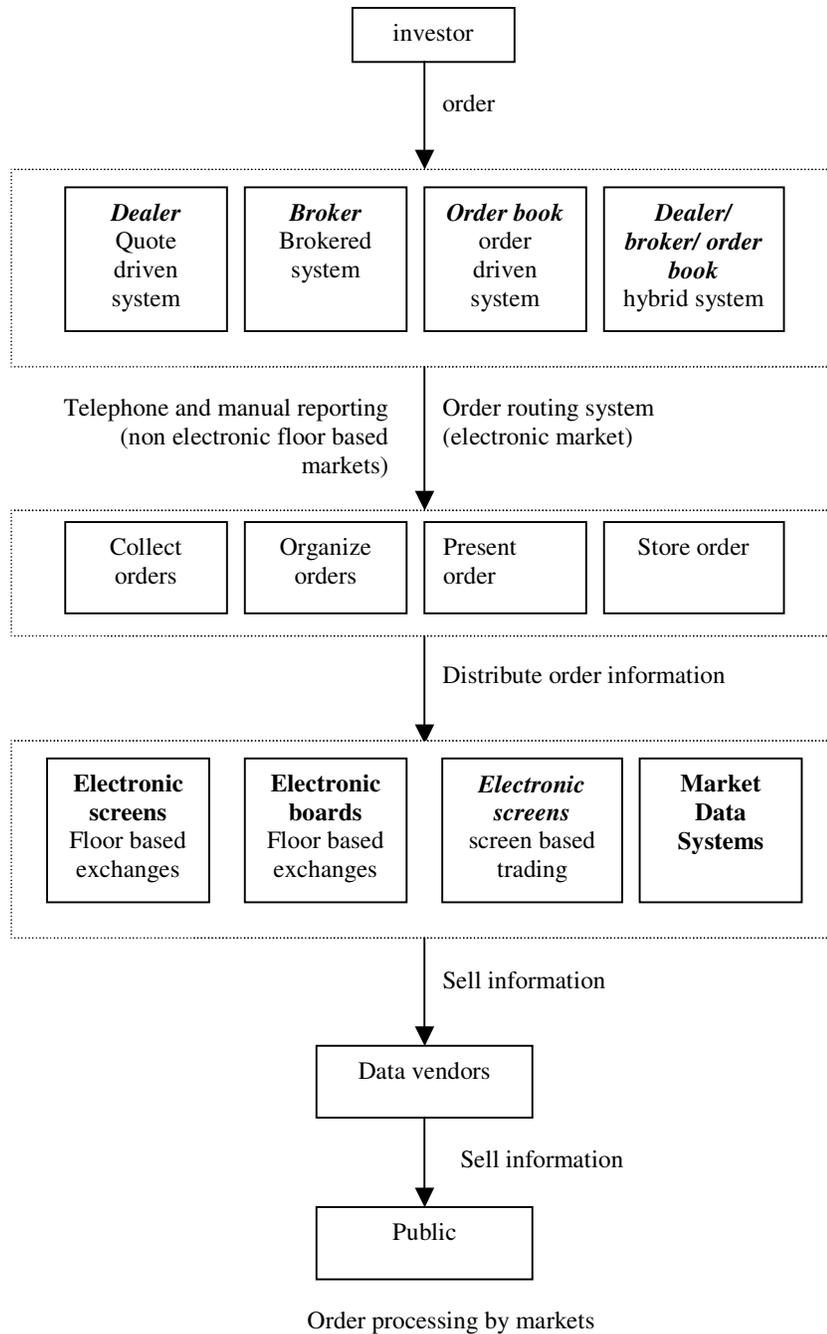


Figure A.3 Characteristics of the financial market structure

## **MARKET EFFICIENCY**

Market efficiency is an important concern for both academics and practitioners. In academic research models efficient markets are prototyped, and tests for efficiency in different markets are undertaken. The efficient market hypothesis (EMH) introduced by Fama (1970 and 1991) is one of the central ideas in modern finance. There are different versions of the market efficiency hypothesis according to the information set that is assumed to be contained in market prices:

weak form efficiency: current market prices reflect all information on past prices.

semi-strong form efficiency: current market prices reflect all publicly available information.

strong form efficiency: current market prices reflect both public and private information.

Malkiel (1996) stated that a capital market is efficient if it fully and correctly reflects all relevant information in determining security prices. This implies that it is impossible to make economic profits on the basis of that information set.

All the empirical research on the theory of efficient markets has been concerned with whether prices fully reflect particular subsets of available information. Weak form tests were conducted with the information subset of interest being past price histories [Fam70]. Weak form tests include serial correlation, runs, trading rules, and variance ratio tests [CLM97]. The semi-strong form efficiency test of the adjustment of prices to public announcements is conducted using an event study methodology. The test for private information (whether specific investors have information not in market prices) is used to test the strong form of efficiency [Fam91].

In practice, investors are highly concerned about getting fair prices and achieving high returns. Market efficiency implies also an optimal allocation of resources in the economy.

Three types of market efficiency are identified [Arn98] and [Kol96]:

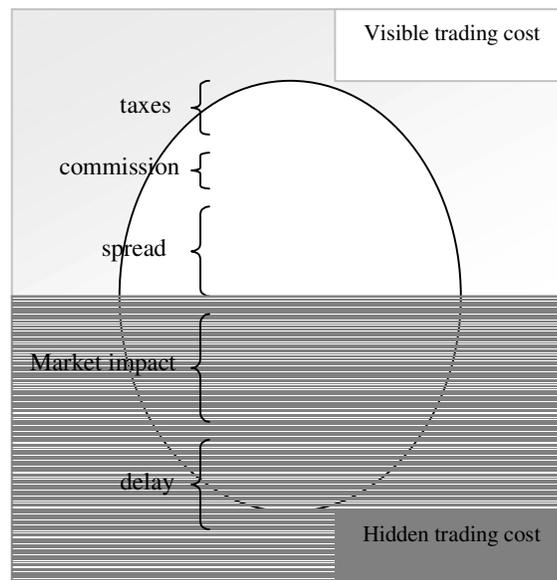
*Operational efficiency:* A financial market is operationally efficient if it works smoothly, with limited delays (orders can be transmitted from all parts of the world to a market very quickly, and are quickly executed and confirmed). Markets should carry out their operations at the lowest possible cost. Competition among markets is an ingredient in increasing operational efficiency. Technology is also an important factor in achieving operational efficiency. A market may be operationally efficient, however, without being informationally efficient.

*Allocational efficiency:* Resources in the economy are scarce, and it is important to allocate resources in a way to achieve optimum productivity. An efficient market should channel the fund to help in the growth of different industries.

*Pricing efficiency / informational efficiency:* In a pricing efficient market the investor can expect to earn a risk-adjusted return as prices move instantaneously and in an unbiased manner to any news. An informationally efficient market is one in which market prices adjust quickly in response to new information.

### ***TRADING COST***

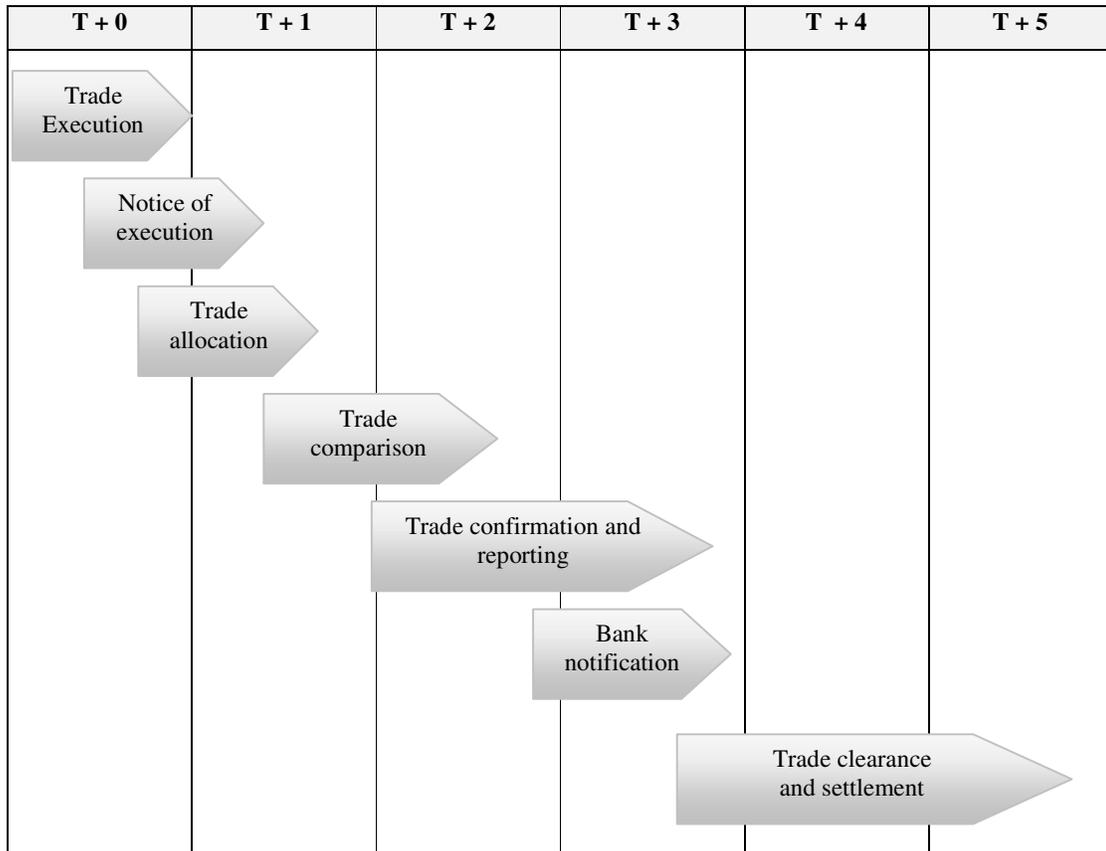
Haynes (2000) subdivided trading cost into a visible and hidden part. The visible part includes taxes, commission, and spread, while the hidden part of the trading cost includes market impact and delay.



Financial Trading Cost

### ***STRAIGHT THROUGH PROCESSING***

The five time steps to execute the three stages of the trading process in the old trading model [Mil99].



The old model for the trading process