

**SURVEY - MASTERING MANAGEMENT - The past, present and future of trading stocks.**

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**SURVEY - MASTERING MANAGEMENT - The past, present and future of trading stocks** - Competition is driving the evolution of exchanges. Lawrence Glosten and Charles Jones look at how they work and the potential for consolidation.

Economists like to make idealised assumptions. When it comes to financial markets, they often assume a frictionless market where demand and supply curves interact to generate equilibrium prices and trades. This abstraction is useful but actual trading mechanisms may not achieve this ideal. For one thing, they require resources, human and otherwise. That means trading costs. Also, each trading venue approaches the ideal differently. This means trading venues are, to a greater or lesser extent, in competition and it means that trading mechanisms are constantly evolving.

This article explores the evolution of this industry. Developments in trading technology and securities exchange organisation are considered and linked to the costs of investing.

#### Exchanges and markets

First, we should be clear about what we mean by the trading industry and what it supplies. If an investor wants to buy or sell, the brokerage function delivers an order with the specified terms to an exchange or other trading venue. At the exchange, buy and sell orders are executed according to execution rules. Finally, the clearing function ensures both sides of a transaction honour their commitments - the buyer delivers cash and the seller delivers securities.

Thus, there are several outputs of the trading industry. Transactions are the first output. Simultaneously, a second output is created - prices. The final output is an insurance policy that guarantees the transaction. The customer pays for outputs in two ways. The brokerage commission covers order delivery and clearing (clearing fees are paid indirectly through the broker).

The customer also pays for immediacy via the bid-ask spread (the difference between the price at which dealers are prepared to sell a share and the price at which they are prepared to buy). In return for a quick transaction, a buy order usually pays the higher asked or offer price, while a sell order receives the lower bid price.

The oldest form of exchange is the pure dealer market. In a dealer market, designated individuals called dealers or marketmakers are the counterparties to every trade. Dealers quote bid and offer prices at which they are willing to, respectively, buy and sell. Buyers use a broker to locate the dealer with the lowest offer and customers who wish to sell locate the dealer with the highest bid.

Nasdaq in the US and the London Stock Exchange are the canonical examples, although neither is a pure dealer market. Another example is the Nouveau March\* in Paris, a market for new and smaller publicly traded companies.

At the other extreme from the pure dealer market is the electronic open limit order book. This exchange has no designated market makers - the quotes come from limit orders submitted to the limit order book. Customers of this exchange who wish to trade, but are patient, submit limit orders specifying buy or sell, number of shares and a price. The highest limit buy orders become the market bid and the lowest limit sell orders form the market offer. Individuals who wish to trade immediately submit market orders that trade with the limit orders.

Examples of this type of market abound - Tokyo, Toronto and Paris were the first, and many European exchanges, including Frankfurt and Stockholm, have moved to this form. Electronic limit order books have also sprung up in the US in the form of electronic communication networks (ECNs). Instinet and Island are prominent examples.

The electronic open limit order book has the advantage of efficiently concentrating competition between "liquidity suppliers" who quote. In contrast, there have been concerns that dealer markets are prone to non-competitive behaviour which have led to antitrust investigations. But there are lingering concerns that an electronic open limit order book may provide less liquidity than a dealer market during volatile times, or for less-frequently traded stocks. So it isn't obvious that one system is superior to the other.

The New York Stock Exchange's trading floor is a hybrid of the two systems. Floor traders and the specialist (an individual designated by the exchange to manage the trade in a security) sometimes act as brokers and sometimes act as dealers, buying and selling for their own account. Nevertheless, the NYSE has an active limit order book, largely because it has become so easy to submit orders electronically.

Some commentators claim that trading floors are dinosaurs. But defenders counter that hybrid markets such as the NYSE can be all things to all investors. The limit order book provides for cheap execution of small orders and floor broker/dealers handle larger institutional trades. In any case, trading floors are concentrated in the US (NYSE and smaller regional exchanges, as well as futures and options exchanges) and Asia. Most European exchanges are virtual.

## Costs

Trading costs around the world have fallen dramatically. The US is a case in point.

## Tick size

Competition between brokerages and increases in trading volume probably explain the decline in trading costs. But the way trading is conducted matters as well. A good example is the minimum price increment or minimum tick.

Before 1997, the minimum tick in the US was, for the most part, an eighth of a dollar, or \$0.125. In the spring of 1997, US exchanges adopted sixteenths, halving the minimum tick. This year, eighths and sixteenths disappeared from the NYSE, the American Stock Exchange and regional US exchanges, replaced by decimal prices. Nasdaq finished converting to decimals in April and equity options switched as well. Toronto Stock Exchange adopted decimals in 1996 and Tokyo Stock Exchange, already decimalised, reduced its tick size in 1998. Does this matter to investors?

First, decimals themselves are not the story. From a trading cost point of view, the key variable is the minimum tick. Toronto and US exchanges set a penny ( \$0.01) as the minimum tick in their respective currencies, so the tick is more than 12 times smaller than it was five years ago. Why a penny? Mostly because it is the simplest increment but it may not be the ideal size.

Smaller ticks have some benefits. Bid-ask spreads shrink. For example, pennies have lowered NYSE spreads by 20-30 per cent. This is good news, especially for investors who submit small market orders.

Unfortunately, smaller ticks are not good news for every investor. A study by academics Charles Jones and Marc Lipson found that when the NYSE went from eighths to sixteenths (data aren't available on pennies yet), trade became more expensive for institutions. Total one-way institutional trading costs rose from 0.68 per cent under eighths to 0.85 per cent under sixteenths. A possible reason: liquidity is supplied more slowly with smaller ticks, because narrow ticks give floor participants an advantage over electronic limit orders. For example, someone on the floor can jump in front of a limit order by improving the price just one cent. So electronic orders often miss out and get filled only when floor traders decide to pass.

Economists call this adverse selection; traders call it "penny jumping" or "getting pennied".

On an electronic exchange, with neither floor nor designated dealers, "pennying" is not possible. Yet evidence from the Toronto exchange (which is electronic) is that while the spread has shrunk for small trades, it may be more costly to complete a large trade. In fact, the NYSE is reviewing the move to trading on pennies, largely because of complaints from institutional traders.

Evidence is pointing towards the conclusion that the tick can be too small. Exchanges and regulators outside the US need to trade off the benefits of a smaller tick against its subtle costs. End-users should care, too. When the tick size shrinks, investors need to think carefully about using a market or a limit order. It may make sense to switch to the former.

### Market fragmentation

Market fragmentation refers to the splintering of order flow that occurs when several exchanges are available to execute a trade. It is especially pronounced for Nasdaq stocks. Twenty years ago, almost every trade in a Nasdaq stock was over the phone with a dealer. Nasdaq dealers still make markets, but now there is a dizzying array of alternatives. Most prominent are ECNs, the computerised limit order books mentioned earlier. There are other types of trading systems as well, each with its target audience.

Fragmentation is much maligned. The main argument against fragmentation is that information and search costs are lower if all the buyers and sellers for Microsoft, for example, are gathered in one physical or virtual place. In economists' jargon, there are network externalities associated with a single exchange.

It is clear, however, that there is demand for different types of trading systems. A good example is Posit, a crossing network run by ITG. Seven times a day, institutional orders are aggregated and traded at a prevailing midpoint price. The idea is to concentrate liquidity by executing trades at discrete points in time rather than continuously. The concept is not new; gold trades in London in a similar fashion. Posit doesn't have a huge market share, crossing about 30m shares a day last year compared with about a billion a day on NYSE or Nasdaq. But institutions like the system for two reasons. First, if their orders execute, they avoid paying the bid-ask spread. Second, the system is anonymous. No broker sees, for example, that a pension fund is trying to buy a million shares of IBM. That means no broker is able to buy IBM in advance and drive up the price before the pension fund's order is executed. Avoiding such "front-running" has obvious appeal for the pension fund.

Another example is the Paris Bourse and the London Stock Exchange. Paris has an electronic limit order book, while London has a dealer market similar to Nasdaq. Many stocks are listed on both. Compared with London, Paris has narrower spreads between bid and offer, but quotes are good for fewer shares. This is attractive to the retail trader. London, on the other hand, is the trading venue of choice for institutional traders. The market is deep (a trader can buy or sell a large number of shares) and negotiations between dealer and trader often provide price improvement from the relatively wide quoted spreads.

The point is that different traders (or the same trader at different times or for different stocks) may have different needs. A small retail trader may value the small spread of the electronic limit order book in one stock. An institutional trader may value the anonymity of Posit for one trade and the ability to negotiate for another.

How can this competitive benefit of fragmentation be obtained without the problems? The answer lies in having an information system that effectively connects the various trading venues. First, traders need to know not only the quoted terms of trade at any time for each venue, but also all the transactions that have occurred. Second, to exploit network externalities, there needs to be an efficient means of transferring excess supply in one exchange to excess demand in another. That is, the fragmentation needs to be consolidated.

The provision of information about quotes (ex-ante transparency) is standard around the world. The extent of ex-post transparency (information about trades) varies considerably. We can expect considerably more ex-post transparency as investors force exchanges around the world to provide the timely trade information required in US markets. The final step - consolidating order flow across exchanges - is more problematic. But resolving the fragmentation issue may depend on what happens in the way of joint ventures, alliances and mergers of exchanges.

#### Ownership structure

There has been much talk of exchange mergers and joint alliances. Nasdaq and the American Stock Exchange (Amex) merged in 1999. The French, Dutch and Belgian bourses have merged into Euronext, now the second largest European exchange.

On the other hand, merger talks between the Frankfurt Exchange and the London Stock Exchange broke down in 2000. Both Nasdaq and the NYSE have frequently spoken of alliances with European and Asian exchanges but nothing substantive has been implemented.

Still, the economics of liquidity provision point towards further ownership consolidation. There are economies of scale in providing exchange services.

This is most obvious for clearing (guaranteeing trades). Greater synergies come from the ability of a single organisation to provide a common technology that will allow separate trading venues to communicate efficiently. If this happens, investors will reap the rewards of competing trading architectures without losing the network externalities of consolidated trade.

The future

What might happen in the next decade? The NYSE has a strong franchise and has been executing well lately, especially on the technology front. There are questions about how much value specialists add but the NYSE is working hard to automate some of the specialists' simpler tasks, freeing them to focus on larger trades and the bigger picture of maintaining and allocating liquidity across market participants. Nevertheless, the trading floor is the NYSE's most valuable asset. No other exchange handles large trades as effectively and the floor is the reason. The network externalities in stock exchanges are strong and the NYSE would have to stumble badly to lose out to a competitor.

There will probably be an ECN shakeout in the US. Because of the network externalities in trading stocks and the similarities between ECNs, this is a winner-takes-most arena. In two years, there may be just two ECNs left. The winner or winners will likely battle with Nasdaq's traditional marketmakers for market share, with no clear winner for some time, if ever.

Moving to the global market, the trend for increased cross-listing of stocks is likely to continue. This is mostly a time zone phenomenon. It is much easier for a New Yorker to trade Siemens during NYSE trading hours than to wait for Frankfurt to open.

What will this do to investors' trading costs? Consolidation of exchange ownership could lead to efficiencies in clearing and information costs. Further competition from electronic brokerage, electronic exchanges and other technological improvements could bring more reductions in commissions and bid-ask spreads.

However, technological and regulatory changes are not the only determinants of transaction costs. Over the course of the 20th century, when the market went up, trading costs usually went down, and vice versa, and that should continue.

Looking back, big market moves in either direction often spur changes from without (regulation) and changes from within (innovation in good times, wrenching reorganisations in bad times). Stock returns and volume growth are likely to be more modest in the coming decade and capital markets will not fund new entrants as generously as they did in the 1990s. As a result, the next 10 years are unlikely to be as dramatic as the last.

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Further reading

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