Electronic Trading in Australian Financial Markets

Introduction

Electronic trading of financial assets, such as bonds, equities and foreign exchange, was virtually non-existent 20 years ago but has grown in importance since then. Recently, the pace of development of electronic trading systems has accelerated as market participants apply internet-based and other network technologies to trading systems. This article outlines current developments in electronic trading systems in the Australian financial markets and discusses the forces behind, and implications of, these developments.

Some Preliminaries on Market Infrastructure

The trading of financial assets can occur within one of two broad market structures. In an exchange-traded market, trading is conducted anonymously on a centralised exchange. In an over-the-counter (OTC) market, there is no centralised exchange. Rather, each trade takes the form of a bilateral arrangement between the buyer and seller. In Australia, almost all equity trading, and most derivative trading, is conducted through exchanges. Trading in foreign exchange and bonds, on the other hand, is mostly conducted in OTC markets.

Within each of these two broad structures, trading may or may not be done electronically. Equities in most countries are exchange traded. In some, such as Australia, trading is electronic but in others it still takes the form of open outcry. Bond markets tend to be OTC. In Australia, virtually all bonds are traded by telephone. In the United States, however, around half of all bond trades are done electronically.

Across all markets, there is a distinction between inter-dealer trading on the one hand and dealer-customer trading on the other. To date, electronic trading is much less common among the latter sort of trades than among the former, though the growing use of internet portals – central sites through which potential parties to a trade access the sites of a number of parties simultaneously – and the electronic media, is extending the use of electronic trading to this market segment.

Finally, it is useful to divide trading into its three component parts: price discovery – the customer seeks quotes from a number of other traders to find the best price; order – the customer submits a firm request to undertake a transaction; and execution – the buyer and seller commit to a contract.

The Status of Electronic Trading in Australia

Table 1 summarises the extent to which each of the three main steps in a trade is conducted electronically. Exchange-traded equities and derivatives are the most highly automated of financial markets in Australia. Nonetheless, orders are typically still taken over the phone. Trading in fixed-income and foreign exchange is still mostly non-electronic, reflecting the value placed on personal contact in these markets. OTC derivatives trading is mostly non-electronic because of the relatively complex and heterogeneous nature of these instruments. Table 2 summarises the history of electronic trading in Australia. The rest of this section provides more detail for each type of instrument broadly defined.

Table 1: A Typical Wholesale Market Transaction in Australia

Market	Steps in trade		
	Price discovery	**Order**	**Execution**
Fixed-income (over-the-counter)	Phone/electronic	Phone	Phone
Foreign exchange (over-the-counter)	Phone/electronic	Electronic/phone	Phone/electronic
Equities (exchange-traded)	Electronic	Phone	Electronic
Derivatives (exchange-traded)	Electronic	Phone	Electronic
Derivatives (over-the-counter)	Phone	Phone	Phone

Table 2: Chronology of Developments in Electronic Trading in Australia

October 1987	ASX moved to an automated trading system (SEATS) for a limited range of ASX-listed stocks.
November 1989	SFE launched SYCOM – the world's first after-hours electronic trading system.
October 1990	Closure of trading floor at ASX and conversion of all stocks to SEATS.
1992	Foreign exchange dealing rooms started using electronic broker services such as Reuters 2000-2 and EBS.
October 1997	ASX launches its electronic trading platform for trading equity options.
November 1999	SYCOM became SFE's sole trading platform.
November 1999	ASX's interest rate market started trading (retail).
February 2000	Bloomberg submits proposal to ASIC to extend their Bond Trader system to offer electronic trading.
April 2000	*Currenex.com* is launched – the world's first internet-based multi-dealer foreign exchange service.
November 2000	Australia's four major banks announce intention to form an internet portal (*AusMarkets*) for online distribution of financial services.
January 2001	Australian Derivatives Exchange launched.
March 2001	Australian Derivatives Exchange closed.
April 2001	*Yieldbroker.com* granted approval to offer direct trading of bonds through its internet portal.
May 2001	Multi-dealer foreign exchange service *FXall.com* begins trading.
June 2001	Multi-dealer foreign exchange service *Atriax.com* begins trading.
November 2001	*AusMarkets* development put on hold.

Fixed-income markets

As noted, trading in fixed-interest is largely telephone based. However, there is some electronic exchange trading of fixed-interest on the ASX's Stock Exchange Automated Trading System (SEATS). This began in November 1999. Recently, there have been about 22 000 trades a month, for a total average value of around $630 million. This remains only a small part of total bond market turnover, which typically is about $100 billion a month. Currently the ASX market covers approximately 60 interest rate products, including Commonwealth and semi-government securities, corporate bonds, floating rate notes, convertible notes and hybrid securities.

In April 2001, an internet portal was established for electronic trading of fixed-interest securities. This portal, known as *yieldbroker.com*, allows clients to view indicative prices, request firm quotes and execute trades with any of its five current members. Trading volume on *yieldbroker.com* has reached up to $500 million per month. A potential competitor to *yieldbroker.com*, *AusMarkets*, was due to begin trading in late 2001, but put its plans on hold in November 2001. It had aimed to provide trading facilities for short-term money market and debt securities.

As for electronic media, Bloomberg, which has been operating an electronic bond trading system in Europe and the United States for some time, is currently seeking ASIC approval to offer electronic bond trading in Australia. Bloomberg Bond Trader, which uses Bloomberg's communications infrastructure, acts like a bulletin board. It offers indicative prices on a range of Australian government, overseas government and corporate debt and, pending approval, will provide for direct trading. By acting as a central intermediary, Bloomberg has the potential to be more open than an exchange. On the other hand, an exchange could offer anonymity, which large investors like as it helps them avoid revealing their financial situation.

The developments discussed above relate to electronic trading in the secondary market. The internet has, however, already played a role in bringing issuers and investors together in the primary bond market (i.e. at the time that a bond is first issued). In March 2000, Telstra's A$500 million bond issue was marketed to institutional investors through the internet by Westpac and Commonwealth Bank. The Commonwealth Bank also marketed its August 2000 bond issue through its website and the bond was listed on the ASX's interest-rate exchange.

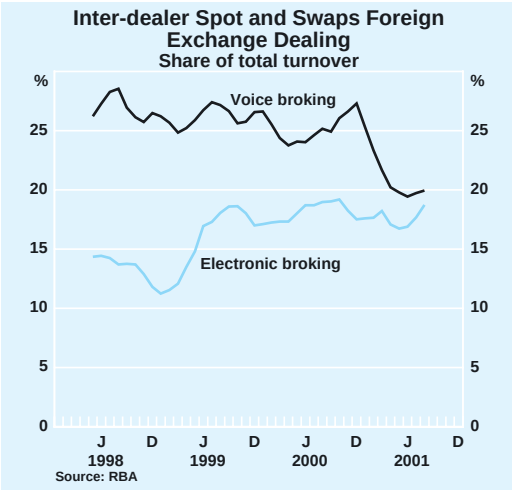
The internet has, however, mainly been used as a marketing tool in Australia. In the US and Europe, various auction systems exist in which an issuer posts details of the security being offered for sale and the specific terms of the auction. Buyers are able to submit bids and the securities are awarded to the bidder that offers the highest price or lowest yield. Such systems are not yet used in Australia.

Foreign exchange

In the foreign exchange market, dealers can trade directly with each other or indirectly with each other in what is known as the brokered market. Most direct trades are still done over the phone. In the brokered market, almost all trading was done over the phone, in what is known as voice broking, as recently as about 10 years ago. Now, almost half of trades in the brokered market are effected electronically, through service providers such as Reuters and Electronic Broking Services (EBS). In June 2001 electronic broking accounted for 21 per cent of turnover in the combined interbank and brokered markets compared to 23 per cent for voice broking (Graph 1). When an electronic broking system is used, price discovery, order placing and trade matching are completely automated.

Development of electronic trading in the dealer-to-customer market is less advanced. There are three multi-dealer internet-based global foreign exchange markets: Currenex, FXall and Atriax. All three provide facilities for trading spot, forward and swap transactions in a large number of currencies including the Australian dollar. Currenex, which began trading in April 2000, is an independent service backed by a predominantly non-bank consortium. It

Graph 1



currently has around 40 market-making member banks. FXall, which began trading in May 2001, has a similar number of market-makers. In addition to the standard foreign exchange products it also provides facilities for trading of foreign exchange options. Atriax has the largest number of dealer members (around 70). It began trading in June this year and plans to add other foreign exchange products and some money market products to its site in coming months. There is considerable overlap in the banks that act as market-makers through these internet portals.

In addition to multi-dealer sites, some dealer-to-customer trading in Australia is done through the banks' own websites. All banks with significant foreign exchange operations offer some kind of online trading platform for their customers. The amount of turnover going through these systems is in line with global trends, i.e. 5 to 10 per cent.

Equities

The bulk of equity transactions in Australia are conducted through organised electronic exchanges; the ASX began screen-based trading in October 1987, when it started trading a limited number of stocks on the Stock Exchange Automated Trading System (SEATS). Although this initiative post-dated the electronically-traded NASDAQ, in the United States, by some 16 years, it nonetheless was a major event at the time.

SEATS facilitates trading between brokers who are members of the exchange. A significant additional development over the past couple of years has been in the application of internet technology to provide an electronic link between brokers and their clients. There are now 1 million customers registered with online brokers such as CommSec and E*TRADE (Table 3). Online trading as a proportion of all ASX trades is currently around 18 per cent (Graph 2).

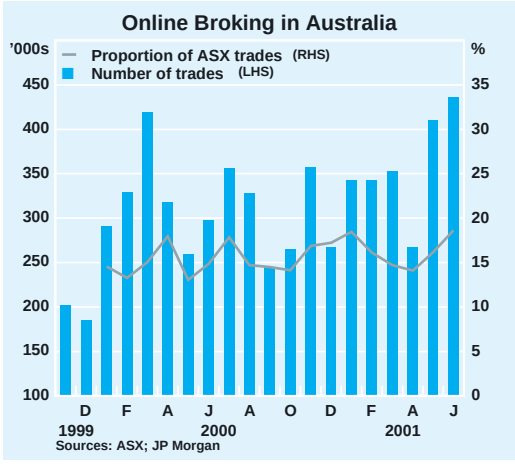
Most of the growth in electronic broking in Australia has occurred on the retail side of the market. While some institutional investors

Table 3: Online Broking Customers
June 2001

CBA	652 100
E*TRADE	82 500
WBC	82 000
Charles Schwab	50 000
NAB	48 345
Sanford	34 817
TD Waterhouse	30 305
HSBC	16 752
Quicktrade	15 017
Total	1 011 836

Source: JP Morgan

Graph 2



have electronic links to their brokers, it is still the case that most institutional investors use traditional broking methods – i.e. investors telephone the broker to submit their order. In this process, price discovery, and trade execution, which are conducted by the ASX, are automated.

Derivatives

In Australia, interest rate swaps and foreign exchange forwards and options, are traded OTC, mostly by phone. Futures, options and warrants are, however, traded on the ASX and the similarly screen-based Sydney Futures Exchange (SFE).

Equity options are traded on the ASX's CLICK screen-trading system, which replaced their floor-based trading system in October 1997. In addition, warrants have been traded on the SEATS electronic trading system since early 1991. The ASX has recently submitted a proposal to ASIC to reactivate the ASX Futures Exchange Limited. This proposal is currently being considered by ASIC.

The SFE's SYCOM (Sydney Computerised Market), launched in November 1989, was the world's first after-hours electronic trading system. Its aim was to provide a platform for the trading of SFE products during the European and North American trading day. A decade later, SYCOM replaced the open-outcry trading system, becoming the SFE's sole trading platform.

Table 4: Proportion of Wholesale Market Turnover Traded Electronically
Per cent

Market	Australia	US
Fixed-income[a] [b]		
– Inter-dealer	nil	50
– Dealer/customer	nil	30
Foreign exchange[b]		
– Inter-dealer[c]	20	46
– Dealer/customer[d]	5–10	5–10
Equities[b]		
– Inter-exchange member	100	50
– Broker/customer[e]	10	40–45
Exchange-traded derivatives		
– Inter-exchange member	100	20
– Broker/customer	5	na

Notes:
(a) United States inter-dealer market data are from the Bond Market Association (www.bondmkts.com); dealer-to-customer market data are from an e-Commerce survey conducted by the Greenwich Group.
(b) Aggregate share across exchange-traded and over-the-counter trading.
(c) Numbers for the US are from Cheung and Chinn (NBER Working Paper No 7416).
(d) Source: Greenwich Group.
(e) Broker estimates for Australia were obtained from JP Morgan. US estimates were obtained from Credit Suisse Hong Kong.

Comparisons with the United States

It is interesting to compare the status of electronic trading in Australia to that in the United States. As shown in Table 4, a higher proportion of equity and exchange-traded derivatives are traded electronically in Australia. While the ASX and the Sydney Futures Exchange (SFE) are fully automated, some large US exchanges (such as the New York Stock Exchange, the Chicago Board of Trade and the Chicago Mercantile Exchange) still operate traditional open-outcry markets.

In the inter-dealer foreign exchange market, there has been greater take-up of electronic trading in the US. Because of well-established relationships between the various participants in the Australian dollar interbank market, there was initially little usage of electronic trading. However, of late, electronic trading has been garnering an increasing share of Australian dollar trades. In addition, most trades in which neither currency is the Australian dollar are now conducted electronically.

One area where Australia has lagged well behind the US in the use of electronic trading is the fixed-income market. While electronic trading platforms are only just beginning to be established in Australia, in the US they have made significant inroads, accounting for around half of dealer-to-dealer transactions and almost a third of dealer-to-customer transactions.

Across all markets, the dealer-to-customer segment of the market has not been as fast to adopt electronic trading methods as the inter-dealer segment. In the inter-dealer fixed-income and foreign exchange markets, brokers and information services have provided 'offering screens' which display bond and foreign exchange prices for quite some time. Such systems were relatively easy to extend to full trading systems.

Forces for, and Implications of, Electronic Trading

There are several economic factors behind the push towards electronic trading: cost; transparency; risk management; and the potential for anonymity.

The *cost* advantages of electronic trading are two-fold. First, electronic trading has the potential to reduce marginal costs virtually to zero; despite relatively high initial overheads, the average cost of electronic trading becomes lower than that in traditional markets as trading expands. (Homogenised products such as foreign exchange might be expected to benefit most from these economies of scale.) Second, investors can gather information quickly, forcing greater competition among brokers.

The enhanced *transparency* afforded by electronic trading systems means that all investors – large and small – can actively participate and respond more quickly to changing events within the markets. Electronic systems have the capability not just to improve transparency of prevailing prices in a market, but also to provide more information on the depth of a market (for example, by showing potential supply and demand that would transact at prices away from the current market price).

Third, electronic trading facilitates 'straight-through processing' not only reducing costs of settling transactions but also offering better *risk management*. Under straight-through processing, all administration of an agreed trade is done automatically. This helps to minimise the risks of fraud and human error associated with manual trade processing. Online brokers that use straight-through processing pre-validate and reserve a client's securities or funds before the order is submitted to the market. If the client does not have the stock or cash, the trade will not proceed.

Electronic systems offer the potential for a fourth attraction to participants: *anonymity*. Anonymity between potential counterparties enables participants to place big positions without revealing their financial situation. It is possible to design electronic systems that provide complete disclosure of counterparty details, full anonymity or anything between these two extremes. A number of the systems operating overseas, however, provide a high level of anonymity and it is argued that this is an advantage over traditional phone-based dealing in over-the-counter markets where participants find it difficult to conduct large transactions without having market prices move against them.

There is, however, a tendency for institutional 'heritage' to affect the pace of development of electronic trading systems. The Australian foreign exchange market, with its longstanding relationships between interbank participants, seems to be a case in point.

Two policy concerns that arise from the growth in electronic trading are its impact on market liquidity and the risks that may follow from concentration of ownership of electronic trading systems.

The likely impact of electronic trading systems on liquidity is ambiguous. Other things being equal, the lower transaction costs

and greater access to market information associated with electronic platforms could reasonably be expected to underpin both increased activity by existing market participants and a broadening of the market. In particular, the availability of electronic trading platforms should encourage increased participation by retail investors. Liquidity should also benefit from the anonymity provided by electronic exchanges to the extent that this feature allows market-makers to manage large transactions more efficiently.

On the other hand, the proliferation of electronic trading systems should increase competition among market-makers and underpin the global trend toward consolidation in this sector of the industry. A decline in the number of market-makers could be expected to have a negative impact on liquidity, other things equal. In addition, there is some uncertainty about the performance of electronic trading systems in times of market stress. There are concerns that at such times, participants may be less willing to use electronic systems and that liquidity will suffer from the absence of dedicated market-makers. However, the global experience to date, albeit limited, suggests that electronic markets perform as well in times of stress as other markets. In part this is because market-makers may fail to fulfil their role in both electronic and traditional markets in times of severe stress. It is also possible to devise electronic trading systems with strict market-making obligations for some of the system's participants.

On balance, it is difficult to predict with any certainty how widespread use of electronic trading systems would affect market liquidity. However, the Bank for International Settlements, in their 2000 study of the implications of electronic trading, found that at this stage there are no clear signs that liquidity has been adversely affected by the introduction of electronic trading.

Electronic trading systems are characterised by network effects and economies of scale that create 'first mover' advantages. The network effects are due to the fact that the benefit of participating in a network, such as a financial market, increases with the number of participants in the network. The high fixed costs of developing the technological infrastructure accompanied by the low ongoing variable costs of running a system once it has been developed mean that there are substantial economies of scale in electronic trading systems.

As a result, there may be a tendency for monopolies to form in the provision of trading systems and for the full cost savings from electronic trading to not be passed on to market participants. The potential for monopolisation also poses the risk that a market's functioning becomes heavily dependent on one computer system. For the present, however, there are a variety of systems in use and in development. New technologies also provide the scope for contestability from abroad. This suggests monopolistic tendencies will be constrained for some time. ☆