

KOREA'S ONLINE STOCK TRADING BOOM: FACTS AND IMPLICATIONS

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ABSTRACT

The Asian financial crisis of 1997-98 was a major setback for Korea, one of the world's most successful economies in the post-war era. Nevertheless, the financial crisis has led to some positive changes in Korea's financial system. The Korean government, in conjunction with the IMF, is carrying out comprehensive structural reforms in the financial system. In the meantime, online stock trading has grown explosively since 1998 to the extent that Korea now has the world's highest penetration rate in this area.

In our paper, we analyze the fundamental factors driving the rapid growth of online stock trading in Korea. We then examine the implications of such growth on the competitive environment of Korea's retail brokerage industry as well as the liquidity, volatility, cost structure and efficiency of the stock market. We also look at the relationship between financial reform and online trading. In addition to exploring possible changes in the value propositions of brokerage firms, we also examine new regulatory issues that have

emerged in line with the rapid growth of online trading. In short, our main objective is to study the causes and effects of Korea's online trading boom.

1. INTRODUCTION

The Asian economic crisis that struck Korea in 1997-1998 appears to have led to some positive changes in the financial system. Economic recovery has exceeded expectations and the surviving banks are beginning to regain their balance. In the meantime, the Korean government, working with the IMF, has pressed forward with a programme of reforms that are designed to equip the country with a financial system similar to those in developed economies. Financial institutions will have to adapt to a new environment in which they have much greater freedom of activity, but face stiffer competition, including foreign competition for the first time.

With the advent of the Internet, Asia's online brokerages are accounting for an ever-increasing proportion of securities trading in the region. Many are already converting

traditional trades through local brokers to comprehensive day trading via the Web. In a region where financial services are relatively expensive and real time information scant, the Internet is a boon to retail investors. In Korea, since online securities trading, defined as buying and selling stocks, options, and mutual funds over the Internet, was introduced in 1997, its growth has been explosive. Many companies have had to install firewalls on office computers to block employees' accessing stock-trading sites during work hours.

In the past, large local brokers have had quasi-monopolies on market activity, and thus were able to regulate transaction fees without broadening investor services. The new, reformed financial architecture and growing competition by Web-based brokers means that many financial players are now facing ever-increasing local and global competition. Many securities firms, especially the smaller and medium sized ones, are now turning to Internet trading to find their niche market and build up their core competence. Their success directly threatens the more established firms that have watched similar developments in North America with a growing sense of unease.

2. BACKGROUND

The past few years have witnessed a dramatic and revolutionary development in the securities trading market. Although electronic system has been used to match selling and buying orders from traders since the late 70s, until recently contacts between investors and brokers were still performed manually, mainly through phone calls or faxes. Trader's orders would be passed to the broker by phone or fax and keyed into the brokerage house's computer system that is linked to the stock exchange's computer system. Upon successful completion, the broker would call or fax the trader to give confirmation of the transaction or provide other market data.

With the advancement of the Internet and information technology, stock trading has derived a new way of trading called online trading [see Pfeiffer (2001)]. Now, with any computer connected to Internet and automated execution software provided by the broker, a trader can directly access the brokerage house's computer system to put in an order and track the transaction in a timely fashion [see *Investors Digest Malaysia* (2000)]. The trader

controls his own data and the broker's value is in giving relevant advice, and no longer in handling the transaction or the data. In other words, online trading eliminates human intermediaries.

The elimination of the middlemen reduces the cost per transaction and computerization speeds up the trading process. Moreover, online trading has further promoted convenience with a growing pool of additional services for investors. They can trade from virtually anywhere in the world, even from the local market hours, by automated computer networks among exchanges. All these advantages, supported by the established infrastructure, increased access to the Internet, government policy and better education system, are altering the investment world and creating a new breed of investors. They are self-reliant, computer literate, and most remarkably, intent upon acting independently of traditional brokers. As cited in recent Securities Exchange Committee's report, the number of accounts opened in the first half 1999 in the US market alone almost tripled the total accounts opened in 1997, and online trading volume has increased five-fold since 1996. These growth trends are expected to continue well in the next decade.

According to a detailed study by Deloitte & Touché [see The Marketing Audit Inc. (2001)], the emergence of securities online trading also raises some critical issues. In the online technological environment, risks regarding system reliability, system security and system performance have become substantially higher. For many new traders lured by promise of easy money, ignoring prudent investing principles can lead to undesirable levels of risk. Brokerage industry has become rigorously competitive, drastically pushing down the brokerage fee. Full-service firms, threatened by the vigorous competition from discount brokerage houses, are rushing to establish online presence and offering deeper analysis about listed companies, hoping to win back some customers and managed assets acquired by the first movers. One of the government's concerns about online trading stems from uncertainty about taxation since geography becomes meaningless on the Internet and no one knows if the current tax system can or should be adapted to address this aspect of e-commerce.

The rapid development of online trading also poses many problems from a regulatory perspective. The top three regulatory issues are

the suitability requirement, the ability to accept electronic signatures, and investor education. In term of tackling the higher risk taken by the investors, regulators must focus on the education and protection of online investors. The regulators require online brokerage firms to provide the investors with detailed information on order routing and detailed disclosure about the technical performance of their systems. They are also concerned about the advertising practices of online securities brokerage firms, best trade execution, customer suitability and advice and compliance with existing securities laws.

3. ONLINE STOCK TRADING IN KOREA: THE FACTS

It was not until April 1997 that the Korean government amended the *Securities and Exchange Act* to allow trade orders by telephone, telegram, fax, computers or other electronic communications devices in addition to traditional document-based orders, thus making online securities trading possible. In January of 1998, only 1.3% of total trades was conducted electronically. By May 2001, the figure had soared to 67.4%, the highest in the world, with online trading value surging 280-fold from 0.5 trillion won to 141 trillion won [see *Korean Industry Update* (2001b)]. Inspired by the phenomenal growth of online trading, some market players in South Korea contend that 100% of all stock transactions may be made in cyberspace in the future [see *Korean Business Review* (2001)].

As the interest of Koreans in online trading accelerates, the number of online trading accounts continues to explode. In January 1998, there were only about 78,340 online securities accounts, but by December 1998, the number grew to 227,350, representing a growth of 190%. By May 2001, South Korea had some 4.17 million online securities accounts, a growth of 17 times. These accounts already accounted for 48.2% of all active securities trading accounts. Meanwhile, the monthly average online securities trading per account in 2000 was 30.94 million won, with the monthly average order number per account being 12.8 [see Korea Securities Dealers Association (2001b)]. In fact, a recent survey revealed that 92% of Korean retail investors preferred online trading to using traditional brokerages [see *Asiaweek* (2001)].

With more than 60% of online trading penetration rate, South Korea is the undisputed

king of Internet stock trading in the whole world. Its online trading percentage is higher than United States, which some estimated has 40% of online trading penetration [see Yiu (2000)], a great achievement for South Korea considering that United State has a longer history of discount brokerage services. Among 13 members of ICSA, an international securities industry association, South Korea also surpasses all other members in terms of online trading percentage, topping 40% of second-ranked Canada and 28% of third-place France [see *Korean Industry Update* (2001a)].

In Asia, although Hong Kong has only a slightly lower Internet penetration rate than Korea - 22% versus 25%, according to Morgan Stanley Dean Witter [see *Asiaweek* (2001)], its online trading is far behind South Korea. In November 2000, 13 per cent of stock trading was done through the Internet, according to Hong Kong SFC senior director Barbara Shiu [see Yiu (2001)]. However, other leading Asian markets such as Japan, Singapore and Taiwan are likely to experience big increases in Web-based retail securities trading over the next few years. For less developed regional markets such as India and Malaysia, online securities trading obstacles include regulatory stalemates and the lack of Internet-based securities transactions environments [see Gartner.com (2001)].

Korea securities companies play an important part in the booming online securities trading. They have been fast and active in developing online trading systems. By October 1998, the majority of Korean securities companies had fully incorporated these systems into their transaction systems. From 1999, almost all the Korean securities companies started to emphasise online trading services as part of their core business strategies [see Korea Securities Dealers Association (2001b)]. By contrast, even some of the world's leading brokerages such as Merrill Lynch and Prudential have been slow in offering online trading.

In Korea there are a total of 38 companies that offer both online and offline securities trading. Six companies offer only offline trading and another 20 foreign firms offer also only offline trading. There is a high concentration of market share by the big players (Table 1-1). In January 2001, Daishin accounted for nearly 50% of the total with 63.87 trillion won in online trading, which was followed by Samsung (17.87 trillion won), LG (15.2 trillion

won), Daewoo (15 trillion won) and Hyundai (14 trillion won). All of them have seen online trading make up the bulk of their turnover. However with the increasing competition, KSDA believes that this concentration ratio will be reduced in near future and there will be high possibility that more merger and acquisitions between small firms will take place, as all companies jostle to gain market share by lowering cost and offer better facilities.

In September 2000, online trading accounted for 80.9% of Daishin's entire stock trading, while Samsung and LG saw the online securities trading constitute 74.1% and 71.1% of their total volume [see *Korean Industry Update* (2000)]. Although small and medium sized securities firms are trying hard to survive by moving to either specialising their operations or to team up with other companies, some analysts forecast that the securities industry will be dominated by those large companies with strong funding capabilities [see *Korean Business Review* (2001)].

Another contributing factors to the popularity of online securities trading is the high percentage of retail investors in the whole trader group. The KSDA reports that individual investors contribute to 86% of the number of stock trading and 71% of trade volume. This level is twice as large compared with the U.S. and other advanced nations. Today, online trading seems to have become a national pastime. It finds its way in housewives, university students and a host of Korean men wanting to make a fortune out of it.

4. CAUSES OF KOREA'S ONLINE STOCK TRADING BOOM

4.1 Repercussions of Financial Sector Reform

The financial crisis in Korea can be attributed mainly to a breakdown of market discipline. An insidious lack of transparency among financial institutions and corporations, "brand name" lending practices, and inadequate analysis and risk management skills were just some of the structural problems of the economy. However since the economic crisis, the Korean financial system has undergone comprehensive reforms, which were agreed upon by the Korean government and the IMF [see PriceWaterhouseCoopers (2001)].

In order to restore market discipline and to ensure the proper functioning of market mechanisms, Korea had to adopt a new regulatory regime. Moreover the growing convergence of financial services and blurring distinctions between financial sectors points to the need for a single supervisory body for the entire financial industry. On April 1st 1998, Financial Supervisory Commission (FSC) was set up as the supreme financial regulatory organization [see Ministry of Finance and Economy (2001)]. It brought together four supervisory bodies - the Banking Supervisory Authority, the Securities Supervisory Board, the Insurance Supervisory Board, and the Credit Management Board.

A key objective of the FSC is capital market development (CPD). It is mainly to support the ongoing restructuring of corporate debt, and to reduce the burden of corporate financing and related risks on the financial sector. One broad area of CPD is the internalization and liberalization of the regulatory regime to attract more foreign investment. Since restrictions on foreign investors were relaxed, shareholdings of foreign investor have surged and, as of end 2000, account for nearly 30% of the Korea Stock Exchange's total market capitalisation [see Ministry of Finance and Economy (2001)].

The FSC has also laid down the institutional framework for greater supervision and a strengthened securities market infrastructure, including stronger prudential rules and regulations, enhancement of market competition, stricter financing, accounting and disclosure requirements. Reforms have also been geared towards improving corporate governance and promoting accounting standards that will underpin the development of more efficient capital market. Under these new guidelines, financial institutions bear greater responsibility for the protection of minority shareholders and are required to appoint outside directors and to establish audit committees for internal check and balances [see Ministry of Finance and Economy (2001)].

Korea was also caught up in the global trend of universal banking and electronic commerce. These landscape changes are an indication that Korea is moving into a knowledge based or digital economy [see Ministry of Information and Communication (2001b)]. The continued deregulation of the financial sector will bring down the longstanding walls between the banking, securities, and insurance industries

and promote greater industry-wide competition and consolidation. Synergies created in the process of financial consolidation, either locally or with foreign partners, are crucial to the increasing efficiency of the financial system and for the successful introduction of innovative products. The introduction of many new rules and regulations governing stock markets will be aimed at preventing market abuse and the promotion of market discipline and security.

As a result, amid the growth of Internet and e-commerce, many players have introduced many user-friendly technologies and services throughout the domestic financial sector and helped reinvent the concept and practice of consumer oriented finance, and encouraged greater participation by individual investors within the financial system. Online trading system encompasses the notion of self-service and the empowerment of individual over vital information, and is thus promoted aggressively by most securities companies.

4.2 High Internet Penetration and Broadband Usage

Korea has among the world's highest rates of Internet penetration and broadband usage [see Ministry of Information and Communication (2001c)]. There are close to 20 million Internet users among a population of 47 million. Korea was also the first country in the world where mobile phone subscribers outnumber fixed-lined customers. Such adequate physical infrastructure means that Korea is well equipped for e-commerce and the New Economy. Below are some of the factors contributing to this trend.

There has been a concerted effort among Korean government ministries to implement a consistent Information Technology (IT) policy across the country. There have been various initiatives to transform Korea into a knowledge-based society. First, the Backbone Computer Network project (1987-1992) was put in place to facilitate the use of PC's in school and work. This was followed by National Information Infrastructure (NII) (1995-2010), an ambitious project to build a high speed network so as to provide a conducive environment for delivering multimedia service across the nation. The Cyber-Korea 21 (1998-2002) project marks another milestone in the government's endeavor to reinvent Korea as an information powerhouse by creating pro-Internet

environment [see Ministry of Information and Communication (2001a)].

The Korean government has also been aggressively propagandizing the importance of Internet literacy in the drive towards an information society. The Korean Information Society Forum was established in June 1998 to raise public awareness about the importance of the ability to use information. A sense of being left behind also pushes people to be more responsive. Culturally, Korea is a closely knitted Confucian society. This has also led to fast growth of entertainment-related Internet usage (e.g. music, pornography) [see Korea Network Information Center (2001)].

The government realized that competition among the private service providers is vital to the provision of innovative products and services. In June 1997, through the revision of the Telecommunication Business Act and the setting up of the Korea Communications Commission, it deregulated the telecom industry and lowered the barriers of entry for Internet Service Providers. The government-initiated low tariff for Internet access has also attributed to the explosive growth of broadband services. Typically, a 2 Mbps Internet access cost about 30,000 to 50,000 Won per month [see Ministry of Information and Communication (2001b)]. According to Ministry of Information and communication, there are a total of 3.8 millions household subscribing to high speed Internet access [see Ministry of Information and Communication (2001c)]. This translates to a penetration rate of about 27%, much higher than the U.S (i.e. 11.1%) and the rest of the world [see Netvalue (2001)].

With the increasing widespread of Internet, the government has also acted to prevent the violation of privacy, and obscenity and violence in the online environment. The Act on Promotion of Accessibility of Computer Networks was revised to enhance the protection of privacy. The Telecommunications Ethics Committee was also set up and tasked to address the issue of obscenity and violence on the Internet and online communication. Steps are also taken to ensure the safety and reliability of computer networks. The Korea Information Security Agency was established in April 1996 and is responsible for developing information security technology and creates public awareness about network security to prevent unauthorized access to computer networks [see

Ministry of Information and Communication (2001c)].

The education system in Korea has also been revamped to focus more on IT related skills. The emphasis starts from elementary schools with the Comprehensive School Information Project (1997-2002) all the way up to universities. There are also plans to provide computer training to housewives, military personnel, farmers/fishermen, and senior citizens to ensure that no group is left behind in the move to improve national IT literacy [see Ministry of Education (2001)].

Post-crisis Korea has also spawned many small and home office businesses. The Internet is perceived as one way to create high value with minimum workforce, capital and other resources. Many businesses have also turned to e-commerce as an added distribution channel or to explore niche market [see Korea Network Information Center (2001)]. As a result, the Internet has become the most popular means of conducting online trading, accounting for 95% of all online trading, as opposed to 3% for PDA and 2% for ARS [see Korea Stock Exchange (2001)].

4.3 Other Factors: Lower Commission and Socio-Cultural Considerations

One of the main reasons why online trading in Korea got off to a blazing start is that established securities firms were quick to adapt to the Internet. Many of them had set up cyber-trading systems by early 1998 and began offering aggressive cuts in commissions from mid-1999, despite the risk of cannibalizing their traditional brokerage business. Transaction fee for the online trades are now only 0.025% to 0.1%, compared with 0.5% charged by traditional brokerages [see Korea Securities Dealers Association (2001a)]. Combined with a bullish stock market, this has triggered a surge of investment by day traders. Many analysts have attributed cheaper online rates as the perfect incentive for many Korean retail investors, who are mostly short-term punters [see Foundation for Advanced Information and Research (1991)]. The soaring online trading volume and accounts subsequently attracted more pure play start-ups and induced existing brokerages to jump on the wagon of online trading, creating network effect and further dragging down the commission rate.

The flood of online trading has its root in culture too. Koreans have been known to have

a propensity for adopting new technologies, even more than other Asian countries [see Eklund (2000)]. One good indicator is the penetration rate of cellular phone in Korea, which is more than 50%, far above the U.S. Koreans also shared a common passion for gambling with other Asian countries [see *The Economist* (2000)]. The speculative nature of online trading further reinforces this habit and was thus well received by the masses. Retail investors account for 73% of KSE's total trading volume and 96% of KOSDAQ's total trading volume.

Reforms in the education sector that emphasize English and computer literacy also contribute to the cause of electronic commerce in general. These efforts have created a new generation of investors, who are self-reliant and able to leverage on the Internet to search for information within and beyond Korea to make wise investment decisions.

As in most other economies, small and medium sized enterprises comprise the bulk of business establishments and provide most employment. Industry policy favoring the *chaebol* has also spawned networks of highly dependent subcontractors, discouraging entrepreneurs. Likewise credit allocation is skewed in favor of large corporations. Thus innovative start-ups and SMEs were starved of funds and this further stymied entrepreneurial spirit [see Department of Foreign Affairs and Trade (2001)].

The massive layoffs during the Asian crisis have caused an unexpected trend – the rise of an entrepreneurial mentality among Koreans. Under the ongoing financial reforms, banks are improving their small business credit assessment skills and efficiency, and cutting back lending to the *chaebol*. KOSDAQ has also made it possible for young entrepreneurs to turn their dreams into reality through easier access to funds [see Asiaweek (2000)]. This new breed of self-reliant entrepreneurs is heeding the call of the government to form a new knowledge-based economy. Many of them have started Ecommerce and Internet related ventures.

5. IMPLICATIONS OF ONLINE TRADING ON KOREA'S RETAIL BROKERAGE INDUSTRY

Since the Buttonwood Tree exchange that took place in New York in 1790s, the brokerage industry has undergone numerous evolutionary changes, many of them attributable to the

emergence of new technologies. With the advent of Internet technologies and the subsequent Internet trading in the last few years, a brand new industry has emerged, online brokerage. We look at how the value proposition is changing within the brokerage industry as a result of Internet technology. We then examine the changes in the competitive environment.

5.1 Shifting of the Value Proposition

At its simplest, the securities industry is composed of exchanges, clearing houses, brokerages consisting of brokers and financial advisors, sellers/borrowers, and buyers/investors. Brokerages engage in the purchase, sale, and intermediation of securities. Securities firms serve four major functions in the financial market. First, they serve as financial intermediaries, matching individual/institutional investors with individual/institutional sellers, and corporate/governmental borrowers. Second, they provide a means of pricing and valuing investments by making timely information about investments available to the marketplace. Third, securities firms furnish a vehicle for the liquidation of investors' assets, as brokers and dealers trade securities for investors efficiently. Finally, they provide investment advice and customer-tailored financial instruments.

Many securities firms serve as both brokers and dealers, with the former trading on behalf of clients and the latter trading on its own account to make a profit. Most broker-dealer firms have headquarters to handle administration, and branch offices to sell and market company services, and assist clients. The type and extent of services offered beyond brokerage and dealing activities determine what category the security firm falls under, namely full-service or discount brokerage. Full-service firms provide a range of services for both retail and institutional customers, while discount brokers usually serve primarily as access channels for retail customers to reach the stock market.

With the advent of the Internet, the brokerage industry has shifted to a new paradigm, electronic brokerage services (henceforth e-brokerage.) Ebrokerage adds a new factor to the value-proposition of off-line traditional brokerages, regardless of whether they are full-service or discount: the Internet medium. This medium can help the dependent investors do their own research, and get informed about new initial public offerings (IPOs). It could

also provide asset management tools. All in all, the Internet makes all the transaction more apparent with its speed and availability.

In this environment, the investors' expectations from the ebrokerages are more demanding than ever before. The most common belief is that e-brokerages must provide hassle-free automated transaction execution along with other products at a reduced price. Those products and services should be available 24 hours a day, seven days a week. Moreover, with the high automation capability of the medium, the services must be customised to match the tastes and styles of each investor. These could include easy and low-cost access to research reports, resource links, tools and analysis, charts and news, custom-made portfolio views, and checking and banking services.

While offering new value propositions for the investors, both e-brokerage and traditional brokerage house can also benefit from the Internet. First of all, the Internet has become a new channel to acquire new customers and sell products and services. The Internet is an ideal medium to help brokerage firms to expose themselves to potential buyers globally and achieve efficient dissemination of product and service information. It expands the opportunity to participate in the customer acquisition processes and improve target customer identification. It facilitates new sales and delivery directly to consumers without time and place constraints. Online stock purchasing is a good example of a new channel that reduces transaction costs both for the seller and the buyer. The Internet also creates new products and services, such as the ability to transfer funds from bank accounts.

The Internet could help increase customer satisfaction as well. Because it is capable of mass customization, the Internet allows custom marketing and personalized products, which translates into greater customer satisfaction and more transactions. Customized service requires an enriched understanding of the ways in which products are used, usage rates, and precise performance metrics, which is now possible via the Internet. Automation web sites can expand and improve customer support 24 hours a day, seven days a week.

Finally, the Internet is providing brokerages cost savings in overhead, labor, transactions, and customer services. It reduces the costs of providing customer support services by providing a cheaper communications medium (cheaper than telephone support) and lowers

transaction cost by eliminating store fronts and improving business processes. Opportunities to streamline payment/receivables processes become a reality, thanks to the rapid development of online transaction technologies.

In conclusion, brokerage firms are positioned to capture a larger share of the customer's wallet. One thing appears certain: in general, e-brokerage will continue to grow in popularity.

5.2 Changes in the Competitive Environment of Korea's Brokerage Industry

Despite the advantages of an online business model, the e-brokerages are facing many new challenges. Ebrokers differ from traditional brokers because they can bypass many of the traditional barriers to entry. The most important difference is the lack of a physical presence (including the branch office and financial consultants) and the associated costs of development such as building cost, overhead, and employee wages. A second key difference is the brokers' strategic approach. While established companies have attempted to retain an established customer base, electronic brokers must follow a customer acquisition strategy. This means they must differentiate themselves, whether through low costs or value added services.

Beyond the physical and strategic differences, e-brokers resemble discount brokers in several ways. They offer discounted prices and pass control of portfolio management to the investor and collect revenue from trade commissions, interest income, and service fees. Competition is even more intense in the aftermath of the financial reforms that took hold after the economic crisis. The commission fee is now subject to fierce price wars between competitors. Deregulation also opens the market to global competition, allowing the participation of the foreign brokerage houses in the local market, making things even tougher for local players.

Brokerage service firms must be aware of the modern consumer who has exposure to the Internet and technology. He or she has greater challenges balancing personal and professional priorities and has less time and energy to select brokerage service providers. The Internet provides access to a much wider potential client base than a physical brick and mortar structure, but also makes it much easier for consumers to compare different service providers. Consumers have both less time to

devote to selection of brokerage service provider and much greater control over the selling process. This can make the cost of attracting and retaining customers become more significant as stiff competition forces e-brokers to offer more innovative and better products and services to win business.

E-brokers have delivered revolutionary products to the market with online trading. However, with more new participants coming to the market, it is extremely difficult for any player to differentiate itself from others through distinctive products. Moreover e-brokers are also facing increasing competition from the existing traditional full-service players, who can offer more comprehensive services for dependent investors. The inevitable maturing of the consumer market for online trading will thus force e-brokers to shift gears and move into non-trading investment business or try to appeal to a wider market.

The fierce competition in the market has led to a situation in which most online brokerage houses depend on fee-per-trade for their revenue. Thus, this business model is fundamentally in conflict with customers' best interest. The incentives to provide investors with stable long-term blue-chip securities are weak when revenues increase with the frequency of transactions. Because of this, some vendors are unbundling their products and services, such as research and access to IPOs. The day traders are the exception. However, they are attracting more regulatory scrutiny, which could have negative spill-over effects for mainstream brokers. In addition to those challenges, traditional brokers, who decide to jump on the e-brokerage bandwagon, face substantial channel conflict with their network of dealers and brokers.

In conclusion, there are two main implications of online trading for the brokerage industry: severe competition and pricing pressure in certain segments. This is likely to continue, as the online brokerage space becomes more crowded with new entrants and traditional brokerage firms moving online and into new segments of the market. However, growth in the number of online trades should provide volume growth. Furthermore, it is possible that some market segments may experience price increases. We foresee a divergence of business models catering to either the asset management model or the high-volume trading model (or, in some cases, both). As competition continues to heat up and more emphasis is placed on assets, not trading volume, other value-added services

will become an important component of e-brokerage. Consequently, only companies who actively change their business models to adapt to the changing environment will do well [see Kang K.T. (2001)].

6. IMPLICATIONS OF ONLINE TRADING ON KOREA'S STOCK MARKET

In this section, we will examine the impact of online trading on various elements of the stock market. In particular, we look at the effects of online trading on the liquidity, market efficiency, cost structure, and volatility of the stock market.

6.1 Liquidity

One essential function of a market is to provide liquidity, that is, the participants in the market should be able to rapidly execute a large-volume transaction with a small impact on prices. There are three dimensions in the operational definition of market liquidity: tightness, depth and resiliency. "*Tightness*" denotes how far transaction prices diverge from mid-market prices and can be generally measured by the bid-ask spread. The greater the spread, the greater the cost of immediacy service such as buying and selling stock to the desired price provided by the market and thus lower the liquidity. Online trading tends to narrow the bid-ask spread by inducing greater competition, which results from lower cost and increased transparency that puts pressure on the dealer's margin.

Evidence from Korea's stock market indicates that since 1999 the quotation spread ratio has increased (i.e. there are more issues quoted in low bid-ask spread). The execution ratio has also increased gradually. According to BIS (2001a), the higher the turnover ratio between the total trading volume and the outstanding orders is, the lower the bid-ask spread.

"*Depth*" denotes both the volume of trades possible without affecting prevailing market prices and the amount of orders on the order books of market makers at a given time. These criteria can be measured by the amount of orders on the books or by market impact, which is the fluctuation in quotes or bid-ask spreads resulting from order executions [see Bank for International Settlements (2001b)] or the successful rate of trade executions. During the last three years, the ratios of market depth and price continuity in Korea's stock market have increased gradually, with some

fluctuation within a year but with a secular upward trend.

"*Resiliency*" refers to the speed with which price fluctuations resulting from trade are dissipated, or the speed with which imbalances in order flows are adjusted [see Bank for International Settlements (2001a)]. There is no consensus yet on how to measure this dimension, and some participants cautioned that online trading systems had not been tested yet in extremely stressed market conditions.

Number and volume of trades and number of market participants are other measures that can be used as readily observable proxies of market liquidity. In the context of the Korean stock market, both the number of accounts and total volume trading has increased. So far the various performance indicators of Korea's stock market support the argument that online trading has led to higher liquidity since its introduction in 1998.

6.2 Market Efficiency

Regarding market efficiency, there are three Efficient Market Hypotheses (EMH): weak-form EMH, semi-strong-form EMH and strong-form EMH. The weak-form EMH assumes that current stock prices fully reflect all historical security-market information. The semi-strong-form EMH asserts that stock prices adjust rapidly to release of all public information while strong-form EMH contends that stock prices fully reflect all the information not only from public sources but private sources as well [see Keane (1985)]. So in general, market efficiency refers to how fast and to what extent security prices adjust to the arrival of new information. Market efficiency is important because the implications are far-reaching for all participants in the market, investors and raisers of capital. Lack of confidence in market efficiency tends to induce investors and fund raisers to focus their attention on exploiting the inefficiencies and walk away from a more positive recognition of the messages contained in the market's prices [see Reilly and Brown (2000)].

Online trading increases the transparency of the whole trading process. Investors can access more information including pre-trade information (i.e. bids, offers and order size) and post-trade information (i.e. price, volume and execution time). It also facilitates the transmission of information among the issuers, intermediaries and final investors with faster processing speed than is possible with manual

processes. Lower commission fee and widening access to market information also encourage greater trading activity. Thus investors can trade instantly once they receive new information that changes their original valuation. All these will help facilitate the whole process through which information is incorporated into the stock price. Therefore, market efficiency improves as a result of online trading. A KSDA research team has come up with the conclusion that online trading empowers the individual investors and as a result, the information gap between institutional investors and individual investors has narrowed considerably [Kang B.Y. (2001)].

On the other hand, increased market efficiency has its downside. The securities market has become more momentum-oriented, in which price movements are more affected by short-term news rather than long term fundamentals. It is also vulnerable to false information and depends critically on the stability of the network system. The increased exposure to information also makes the market more sensitive to global events. In fact, it is believed that KSE and KOSDAQ have become more correlated with NASDAQ [Yoo (2001)].

6.3 Cost Structure

From the market's perspective, cost efficiency arises if the total cost burden for all market players is reduced. Thus we will now discuss how online trading will affect the costs that various market players incur in stock trading.

As for brokerages and dealers, they now have lower processing costs. Electronic trading makes it possible for trades to be passed straight through to the middle and back offices by linking the execution, confirmation, clearing and settlement of trades with market risk management and operational risk management procedures. It does away with intermediate manual intervention so that not only are the overhead costs for back office reduced, but the risk of errors in trade reporting and record keeping is also minimized [see Bank for International Settlements (2001b)].

Investors can also at least reduce certain components of their total costs. By greatly increasing the amount and timeliness of information, online brokerage houses provide greater efficiency and reduce investors' search costs (i.e. the costs of searching for the best price).

Investors' transaction costs consist of both direct and indirect costs. Direct costs involve commissions to brokers, stock exchange and taxes. As we discussed before, these costs have decreased dramatically after online trading was introduced in Korea. But it is questionable whether an investor's total transaction costs have been reduced since brokers can simply add on the lost commission to investors' costs [see Balasubramanian *et al* (2000)].

When investor place orders with e-brokers, they incur direct costs by way of commission. But e-brokerages can extract larger commissions from market makers to compensate for low commission revenue from investors. Market makers themselves can recover the cost of these commissions by operating on a larger bid-ask spread, thus passing along transaction costs to investors. It is a common practice in U.S. that market makers pay a quarter-penny to two pennies per share as a "kickback" to online brokerages for the right to execute their customers' orders. The biggest market maker in US, Knight Trading Group Inc. last year gave over \$139 million in such payments [see Hamilton (2001)].

So whether investors will in fact enjoy lower total transaction costs depends on whether brokerages transform the lost commission into hidden costs for investors. We do not know if the "Kickback" practice exists in South Korea. But from the fact that the less-than-two-ticks bid-ask spread ratio (i.e. quotation spread) in KSE has increased from 26.36% in 1998 to 40.68% in 2000, it seems that investors in Korea generally do not incur more hidden costs because of lower commission payments. In general, online trading reduces brokerages' costs as well as investors' search and transaction costs. Thus online trading is more cost-efficient than traditional brokerage and will contribute to higher trading activities in the long term [see Lim 2001)].

6.4 Volatility

Online trading also has a significant impact on the volatility of stock prices. While it is obvious that the improvement of liquidity, market efficiency and cost efficiency attributable to online trading is clearly beneficial to the financial market, it is open to argument whether an increase or decrease in volatility is more desirable. It is often argued that properly functioning markets should bring about lower price volatility. However, just as a

real estate with no buyers may have a constant price, some assets may have low price volatility for the same reason. But such price stability is not desirable from the market's point of view since it merely reflects lack of liquidity.

Stock price volatility consists of two components. One is gradual price adjustment as new information is incorporated into the share price, which reflects the market's changed view toward the stock's fundamentals. The other is the noise component due to friction in the market. Examples are price abnormality caused by manipulation or market sentiment. While the former price fluctuation reflects market efficiency, the latter causes unnecessary disturbance [see Lucas and Leonard (1989)].

There are good reasons to believe that online trading increases price volatility. It provides more information and disseminates information more quickly, and consequently investors can incorporate the new information into their stock valuation faster than before. On the other hand, online trading may also increase noise or irrational price change. Entirely new information sources, such as chat room message traffic and whisper numbers, may become an avenue of rumor spreading [see Madhavan (2001)]. In South Korea, price volatility has surged since the introduction of online trading. Figure 4-10 shows the annual fluctuation rate of KSE index since 1993. As indicated in Figure 4-10, the market stock price was more volatile in the 1998-2000 period, when online trading expanded rapidly, than in the pre-1998 period.

The direct cause of price volatility is the increasingly active trading. Online trading involves lower commission, more convenience and more control over investors' own trading activities. It thus attracts more and more individual investors to become day traders. In U.S., an average Merrill Lynch (i.e. a full-service broker) customer made four to five trades per year against an average of 5.4 trades per quarter for core investors of E*Trade Group and other ebrokerages in 1998 [see Konana *et al* (2000)]. South Korea has also witnessed an increasing number of individual investors and a corresponding surge in trading volume. The increasingly active trading has resulted in a more volatile stock market. The big question here is, how much of the total trading is attributable to investors digesting more information and readjusting their valuation of the stock, and how much is due to

trading for the sake of trading (i.e. pure speculation)? Since increased volatility can be brought about either by increased efficiency or increased market friction, further insight into this issue will have significant implications for Korean regulators [Woo (2001)].

6.5 Regulatory Issues

One of the major impacts of online trading on the securities market is the sharp increase in day trading volume and volatility. In fact, 89% of day trading volume comes from stock priced below par value (i.e. 5000 won). This is because trading in stock priced below par value is exempt from transaction tax. However the FSC and KSE has recognized that the extreme volatility of the securities market does not help its role as a capital market where companies raise long term funds. From 1st July 2001, KSE imposed a 0.3% transaction tax on sub par stock transaction in an effort to rein in the volatility of the stock market [Lee C. (2001)]. In the longer term it intends to restructure the commission scheme to incorporate the number of orders instead of basing the commission solely on trading value. KSE will also cease the disclosure of aggregate order amounts so that day traders have less information to conduct speculative trades. The last two moves is intended to reduce the excessive number of day trading in both KSE and KOSDAQ.

As the popularity of online trading grows, the need to protect investors is increasing. One of the main issues is the fraudulent circulation of false and misleading information. In 2000, there were a total of 130 reported cases of unlawful securities-related activities. To prevent breaches of online security system as well as fraud or abuses in online transactions, the FSS also inaugurated Korea's first ever "Cyber Force", which is to protect online securities investors from fraud, misleading information, and unfair trading practices [see Lee D. Y. (2001)].

It is vital that the integrity and performance of the IT system be upheld in order to maintain the confidence of the investors. Although there are no implicit requirements on the IT systems, FSS has ordered securities company to come up with a timetable for back-up systems. The securities companies will also be responsible for losses resulting from the malfunctioning of IT systems [Lee D.Y. (2001)].

6.6 Effects on Financial Reform

In the early part of its development, Korea developed the securities market on a trial-and-error basis and introduced a regulatory framework that could fit local conditions. Market crashes in 1958, 1959, 1962 and 1970 have created a negative image of KSE as a manipulated market, and KSE turned out to be of minor significance in mobilizing savings for corporate financing. The limited number of listed companies listed and lower returns compared to other investment made KSE unattractive for investors further discouraged the development of stock market.

The Korean government has actively intervened in developing the local capital market. Specific measures include the Long Term Plan for Internationalization of the Capital Market of 1981, allowing foreign securities companies to set up branch offices in 1990, and the opening of Stock Index Futures Market and Options Market by KSE in 1996.

As of end-1996, the total market capitalization of KSE reached US\$139 billion (117.3 trillion won), and it became the seventh largest stock market in Asia, in term of market capitalization. The rapid development was driven by high saving rates and investment, along with a strong emphasis on exports.

However, the boom was short-lived since the web of implicit guarantees and cozy links among banks, corporations and government created a moral hazard problem – a “too big to fail” mentality resulting in an excessively indebted corporate sector and poorly supervised, shaky financial system. Within less than a year Korea experienced a severe financial crisis and the exchange rate has plummeted from about 950 won to the dollar in early 1997 to almost 2,000 won at year-end. In addition, the interest rate soared from 14% to about 30% in the wake of large-scale capital flight. As a result, total market capitalization of KSE plummeted to US\$41.8 billion (70.9 trillion won).

In November 1997, the government requested a bailout from IMF to avoid a moratorium on Korea’s foreign debt and started financial reform to restore stability and confidence. In order to achieve the objective of reform, the government needs to enhance the stock market as a reliable source of corporate financing. The introduction of online trading has dramatically changed the stock market landscape. It increases liquidity and cost efficiency. It is believed to enhance market

efficiency by making stock prices more informative. At the same time, by attracting more trading activity, it also increases market price volatility, which has ambiguous implications. Research by KSDA shows that the average daily volatility of stock prices from 1996 to 1998 ranged from 11.30 to 13.67 points, while in year 2000 it was approximately 16.06 points [see Korea Securities Dealers Association (2001a)].

In general, online trading has been in line with Korea’s financial reform blueprint. To achieve the long-term objectives of the financial reform, the Korean government has been carrying out financial restructuring efforts, such as tightening the limits on credit exposures of financial institutions, and concurrently limiting the debt-equity-ratios of listed companies. In this context, the role of capital market, especially the stock market, in corporate finance becomes more important. A more developed and robust stock market will certainly promote the government efforts in this area.

On the other hand, by increasing transparency, liquidity, market efficiency and volatility, online trading is making the KSE and KOSDAQ more attractive to foreign and domestic investors alike, and thus has a big potential to attract more capital. In fact, the first effect of the growth of the online securities market was a sharp rise in public offerings through the Internet, supported by the government’s less stringent listing requirement. The government has encouraged Internet-related, small to medium venture companies to offer shares through their Internet homepage. A total of 907 companies made Internet public offerings between August 1998 and December 2000, with 426 companies going public in three months from March to May 2000 [see Korea Securities Dealers Association (2001b)].

During the bull market period from Aug 1998 through the whole of 1999, equity funds raised in both KSE and KOSDAQ totaled about 31 trillion won. In 2000, when the global stock market was bearish, less than 10 trillion was raised in KSE and an even lower figure was raised in KOSDAQ. Even though earlier data supported a positive relationship between online trading volume and corporate financing through the stock market, we should also note that the amounts raised in Korean stock markets are closely correlated to the sentiments of stock markets in other countries, particularly Wall Street.

In the long run, the Korea government seeks not only a more balanced and sustainable capital structure within Korea enterprises but also a more balanced financial system. However, it is now too early to conclude whether the presence of online trading directly encourages Korea's private sector to move away from bank loans and turn to stock market for corporate financing. It is also too early to tell what impact, if any, online trading has had on the extent to which the stock market's performance depends on speculative sentiment rather than fundamentals. The reform program of reducing the corporate debt to equity ratio from 500% to 200%, deemed appropriate during the bull market, will be difficult now given the slump in the stock market. One consolation is that although the dot.com euphoria, online trading penetration rate has remained on a steady upward trend.

Therefore we can conclude the growth of online trading is not solely due to speculative trades resulting from the bull market but can also be attributed to the real benefits of online trading and investors' recognition and appreciation of those benefits [see Wee (2001)]. Hopefully, the growth in online trading and the wide range of benefits that come with it can propel the stock market to the next level of performance and contribute to a more efficient allocation of capital by the Korea financial system. A more efficient financial system will, in turn, improve the Korean economy's efficiency and productivity.

7. CONCLUSION

"Nothing is constant, we seek no permanence". We quote Mr. Konosuke Matsushita, founder of the Matsushita Group, as we contemplate the profoundness of his wisdom in today's business world. The emergence of Internet technology and the many innovative applications that are built on its foundation has rewritten many existing business rules and assumptions. In particular, the brokerage industry has undergone a major shake up in the last decade. The introduction of online broker has redefined the rules of the game and that has put many traditional brokerages scrambling for solutions or face extinction.

As we prepared for the Business Study Mission to Korea, we were surprised by the extent to of Korea's economic setback during the Asian crisis and its strong recovery in the short span of three years. Korea has had to make many tough choices to achieve its remarkable recovery. Despite its linguistic

disadvantage, especially its people's relative poor command of English, Korea has become a world leader in Internet adoption and penetration, and the Internet is widely used by both businesses and consumer. During the course of our study, we have learnt that one area where the Internet has had a particularly big impact is stock trading. Online stock trading has grown exponentially such that Korea has overtaken even the U.S. in terms of the penetration rate for online securities trading.

Our paper has set out to understand the reasons behind this phenomenon. Although online stock trading is an Internet phenomenon, it is also a financial phenomenon. As such, we also had to gain an understanding of the fabric of the pre-crisis financial structure of Korea as well as how the economic crisis and the subsequent reforms have transformed the whole financial sector for the better.

Using modern management theories, we analyse the online brokerage industry and recommended various initiatives that an online brokerage should adopt to ensure long-term viability. Those initiatives jointly form a business strategy, and are based on the changes in value propositions and competitive landscape brought about as a result of on-line trading. On a more macro level, we evaluate the effect of the online trading on the Korea stock market. In particular, we examine the impact on liquidity, market efficiency, cost structure, and liquidity. We also look at the implications of online trading for Korea's on-going financial reforms.

At a broader level, we feel that online trading will eventually spread to all stock markets, the only difference being the timing of implementation. We trust that the content of this paper will be useful to anyone who wishes to have a better understanding of online trading. More specifically, we hope our section on long-term strategies for online brokerage in Korea will provide valuable suggestions to online brokers. We are also confident that our analysis of the impact of online trading on the stock market can provide some insights for other aspiring stock markets so that they can be better prepared when they experience more active online trading.

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