

The Future of Security Exchanges

Robert J. Shapiro

October 2005

S O N E C O N

I. Introduction¹

Large economic, social and technological forces are rapidly changing the way investors around the world trade securities. The most important force is the new economic sovereignty of bytes: Financial assets today typically exist in digital form, their ownership is authenticated and protected through computer system, and their purchase and sale occur primarily through the exchange of digital information among computers communicating across the Internet. The result is a truly electronic market in which the adept use of digital technologies by financial institutions of all kinds has increased the speed and narrowed the spreads of most financial transactions, reducing both the cost of investing and the cost of capital.²

A second critical element transforming the business of buying and selling securities is the force of economic competition. Financial deregulation in the United States and in most other advanced economies, combined with increasing demand for the financial services entailed in buying and selling securities, have produced competitive opportunities, which in turn have driven security exchanges to move rapidly towards electronic markets. A third factor transforming the landscape of security exchanges is the globalization of security businesses, as investors search the world for the highest returns and the most efficient way of securing them. This globalization has further increased the economic value of the new technologies for security trading, through their capacity to execute transactions several orders greater in magnitude and several orders faster than the traditional system, and across language barriers, time zones and national borders.

American security markets provide a microcosm of these developments. Just a generation ago, the New York Stock Exchange (NYSE) and its floor-based auction market -- organized around a small group of human specialists who made markets in every stock for retail brokers, who in turn worked primarily for large institutions and high net-worth individuals -- substantially dominated the American and worldwide security-trading business. Today, electronic trading platforms dominate this global business through electronic exchanges in virtually every major country. Today, the NYSE is the only major floor-based auction system left in the world; and it now trails the electronically-based NASDAQ in both the number of companies listed and the number of shares traded. Moreover, the NYSE announced recently its own plans to offer fully electronic trading alongside its floor-based auction system, through a merger with the electronic platform Archipelago.³ While the NYSE's new "hybrid system" is flawed in several important ways, it signals the ultimate victory of the electronic-trading model over the specialist-based system.

¹ This analysis was prepared with support from Investors Action Foundation.

² Pankaj Jain, "Financial Market Design and Equity Premium: Electronic versus Floor Trading," Working Paper, February 2004, www.afajof.org/pdfs/2004program/UPDF/P749_Market_MicroStructure.pdf; and Robert J. Shapiro, "Cost for Investors of Trading on the NYSE and NASDAQ: A Floor-Based Specialist Auction Market, versus an Open Access, Computer-Based Network," Pacific Research Institute Briefing Paper, November 2004.

³ "Buttonwood: The cyberbuttonwood era arrives," *Economist.com*, April 26, 2005. At the same time, NASDAQ announced its own merger with Instinet, the firm that inaugurated electronic trading in 1969.

In financial capitals around the world, traditional privately-held security exchanges are giving way to publicly-owned corporations, or becoming publicly-owned themselves, and using their new capital to transform the global security-trading business. Auction markets are becoming electronic exchanges; and those exchanges are moving both beyond equities to fixed-income, derivative and other instruments, and beyond their borders to foreign markets, including the United States.⁴ With alliances and mergers proliferating among electronic exchanges around the world, the future of the business of trading financial assets is a global, computer-based electronic network.

II. The Transformation of Security Markets

Security exchanges around the world are in a process of dramatic and dynamic change. Auction markets in which specialists intervene between buyers and sellers in order to preserve stable markets are rapidly giving way to electronic platforms which directly bring together buyers and sellers. This transition to electronic markets also has promoted the consolidation of security exchanges, in which a single exchange broadens its business to encompass a wider range of financial instruments and often extends its market across national borders. Finally, security exchanges are becoming publicly-owned corporations in order to raise the capital to both invest in state-of-the-art technologies and expand the scope and scale of their businesses.

The Transition to Electronic Exchanges. There is a long history of technological changes affecting the organization and operations of financial markets. The introduction of the first nationwide American telephone service in 1915 and the first open-end teletype in 1935, for example, opened exchanges in New York and elsewhere to investors far away from the trading floors. Similarly, the advance and spread of information technologies since the 1970s have transformed financial markets, as they have many other industries. Even before the Internet gained widespread use, equity markets began to develop electronic-trading platforms. Two years after Instinet introduced electronic trading in 1969, NASDAQ became the world's first electronic stock market, followed by the Toronto Stock Exchange in 1977.⁵ Widespread adoption of electronic trading accelerated in the 1990s with the global explosion of the Internet: In an examination of leading equity exchanges in 120 countries, the number using some form of electronic-trading model grew from 20 in 1990 to 101 by 2002, including 85 fully-electronic security exchanges.⁶ Today, every major capital center – London, New York, Paris, Bonn, Amsterdam, Tokyo, Hong Kong, Seoul, Singapore, Shanghai – as well as scores of smaller markets⁷ now depends substantially on electronic trading platforms.

⁴ For example, Eurex now competes with the Chicago Mercantile Exchange in the market in currency futures.

⁵ Pankaj Jain, *op. cit.*, p. 8.

⁶ The NYSE was one of the later exchanges to adopt any form of automated trading. It first allowed for the electronic routing of order through its "SuperDot" system in 1985, but did not create an automated trading platform, called "direct+", until 2000. *Ibid.*

⁷ Smaller equity markets using electronic trading platforms include Chile, Croatia, Nigeria, Pakistan, South Africa, Venezuela, as well as Boston and Philadelphia.

Since the late 1990s, financial markets dealing in fixed-income and other instruments also have moved to electronic trading. From 1997 to 2004, the number of fixed-income markets in the United States and Europe using an electronic platform rose from 11 to 74 exchanges, even taking account of several major mergers.⁸ These bond markets adopted electronic trading later than most equity exchanges, mainly because the fixed-income market itself is very complex -- encompassing a more diverse range of instruments distinguished by a larger number of structural features -- and so requires a more advanced and costly electronic platform.⁹ In the United States alone, the fixed-income market includes many hundreds of thousands of different issues, compared to merely thousands of different equity securities.¹⁰ (Resistance to an electronic-trading model by some of the traditional financial institutions that long dominated the fixed-income market, especially to changes that could reduce their revenues, also probably delayed the transition.)

Futures markets, especially in the United States, have also followed the equity markets in this transition to electronic trading. In May 2000, the International Securities Exchange (ISE) was launched using a purely electronic-trading platform, and rapidly overtook options exchanges that had not yet transitioned to the new model, including the Chicago Board Options Exchange (CBOE) and the London International Financial Futures and Options Exchange (LIFFE). In less than five years, ISE has become the world's leading options exchange.¹¹ Following this success, other options markets also have moved to electronic trading. In the United States, for example, the Pacific Exchange with 17 percent of the options market made this transition in 2002. The American Stock Exchange (AMEX) and Philadelphia Stock Exchange (PHLX) followed with partial electronic trading systems for futures contracts in 2003 and 2004, respectively.¹²

Today, global and domestic competition are driving financial exchanges in virtually every asset class and country to adopt some form of electronic trading. The same economic forces also have prompted many exchanges to merge, expand geographically, and shift their ownership structures.

The Consolidation of Electronic Exchanges. Much like technological change, regulatory changes also have catalyzed significant adjustments in the way financial markets organize and operate. For example, the number of regional stock exchanges in the United States declined from more than 100 to 18 from 1900 to 1940, and declined again from 18 to seven from 1940 to

⁸ "eCommerce in the Fixed-Income Markets: The 2004 Review of Electronic Transaction Systems," *The Bond Market Association*, December 2004.

⁹ The instruments include government, corporate and asset-backed securities, with such structural features as maturity, coupon payments and call options.

¹⁰ Hellen Allen, John Hawkins and Setsuya Sato, "Electronic trading and its implications for financial systems," www.bis.org/publ/bispap07d.pdf, September 8, 2005.

¹¹ In 2004, for example, ISE daily trading grew 47 percent to 1.4 million equity options contracts/day, compared to industry growth of 30 percent. "eCommerce in the Fixed-Income Markets: The 2004 Review of Electronic Transaction Systems," *The Bond Market Association*, December 2004, www.bondmarkets.com.

¹² MEX now executes more than 75 percent of its options-trading electronically. Gary Delany, "Recent Trends in the exchange landscape," www.exchange-handbook.co.uk.

1980¹³ -- and in both periods, government regulations expanding the listing privileges of financial exchanges played an important role in the trend to consolidate. In the current period, it is both technological and regulatory change that has prompted the continued consolidation of financial exchanges. In countries around the world, financial deregulation has permitted security and banking businesses to combine, increasing the economic advantages of single markets that can handle transactions for both. In addition, the widespread adoption of electronic trading has enabled exchanges to use their new technologies to both expand their markets and capture greater economies of scale. This process has been especially evident in Europe. In 1998, for example, the Stockholmsborsen and the Copenhagen Stock Exchange – both electronic exchanges – combined to form NOREX; and since then, the major (and all electronically-based) exchanges in Oslo, Iceland, Helsinki, Tallinn, Riga and Vilnius all have joined as well.¹⁴ Similarly, in 1997, Germany's the Deutsche Borse and the SWX Swiss Exchange combined to form Eurex, now a leading electronic exchange for derivative instruments with some 700 locations worldwide.¹⁵

Perhaps most important, the Paris Bourse, the Amsterdam Exchange and the Brussels Exchange merged in 2000 to form Euronext, Europe's first integrated equity exchange. Moreover, in 2002, Euronext merged with both the Portuguese electronic exchange BVLP (Bolsa de Valores de Lisboa e Porto) and, expanding to new asset classes, the London International Financial Futures and Options Exchange (LIFFE).¹⁶ This process of leveraging a common technology to expand into new geographic markets and new lines of business is also evident in the United States, where the CEO of the NYSE, John Thain, recently stated the NYSE's intentions to both expand into international markets and compete in options and other derivative markets – by merging with the electronically-based Archipelago.¹⁷

The Movement to Publicly-Held Exchanges. The costs of adopting new electronic technologies and combining with other exchanges also have promoted demutualization, or the conversion of privately-held exchanges to publicly-owned companies. This third significant trend in the reorganization of financial exchanges began in Europe with Deutsche Börse AG, which went public in February 2001, followed soon after by the London Stock Exchange. In the United States, the Chicago Mercantile Exchange (CME) demutualized in 2002 with a successful IPO of \$166 million, followed more recently by the Chicago Stock Exchange (CSX).¹⁸

A shift to public ownership not only provides an exchange greater access to new capital; it also enforces an accountability to shareholders that can increase the exchange's responsiveness to new

¹³ James McAndrews and Chris Stefanadis, "The Consolidation of European Stock Exchanges," *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, June 2002, Volume 8, Number 6.

¹⁴ www.norex.com/Norex.asp?lank=3.

¹⁵ www.eurexchange.com/about/company_info/overview.html.

¹⁶ www.euronext.com/editorial/wide/0,5371,1732_4427342,00.

¹⁷ Aaron Lucchetti and David Reilly, "NYSE to Pursue Growth Options Beyond Stocks," *Wall Street Journal Online*, June 23, 2005.

¹⁸ Gary Delany, *op. cit.*

technologies and new trends in the marketplace.¹⁹ All of these factors are probably present in the NYSE decision to acquire Archipelago through a reverse merger that will take the NYSE public.²⁰ At a minimum, the market endorsed the NYSE decision: The announcement of the merger, with its promise of accelerated movement to electronic trading, combined with the demutualization, raised the price of an NYSE seat by \$600,000.²¹

III. The Efficiency Advantages of Electronic Exchanges

For nearly a generation, the American financial system has contained a natural experiment in the relative efficiency of electronically-based exchanges, compared to floor-based auction exchanges, through the market competition of the NYSE, the NASDAQ and, most recently, numerous purely electronic trading systems or “Electronic Communications Networks” (ECNs) such as Archipelago and Instinet, that can trade shares listed on any exchange. The electronic trading model has emerged dominant.

The NYSE has long operated the world’s largest specialist-trading exchange, providing a traditional, floor-based auction in which every NYSE security is allocated to one trading specialist, who receives all orders to buy and sell shares in that company from broker-dealers. The specialist fills the orders by either conducting an auction that matches a seller or buyer or, if necessary, by using his own inventory or financial resources.²² By contrast, the NASDAQ’s electronic-trading model provides a decentralized, open-access, computer-based electronic network in which multiple “market participants” register bid and offer prices for particular stocks, and a computer network executes the orders at the best bid or asked price registered in the system.²³ For companies listed on the NASDAQ, some 250 NASDAQ market-maker firms and independent ECN trading systems such as Archipelago and Instinet complete these trades.²⁴

Under the NYSE model, the specialists guarantee that each stock remains “liquid” – a buyer for every seller and a seller for every buyer. Under the electronic-trading model, with no specialists or trading floor, liquidity is provided by the open access network that draws in numerous participants. The different approaches of the two major U.S. exchanges have produced different costs for firms and investors -- and a clear conclusion: By most measures and in almost all asset classes, the electronic platform is more efficient than the traditional floor-based auction market. The data show, for example, that compared to the NYSE, NASDAQ trades are executed about

¹⁹ *Ibid.*

²⁰ The reverse merger also avoids some of the regulatory burdens entailed in a straightforward IPO.

²¹ www.busrep.co.za/index.php?fArticleId=2498030.

²² Larry Harris, *Trading & Exchanges*, Oxford University Press, New York, 2003.

²³ James Angel, “Market Mechanics: An Educator’s Guide to U.S. Stock Markets,” August 30, 2004, www.content.nasdaq.com/reference/market_mechanics.pdf.

²⁴ Instinet trades NASDAQ stocks under the aegis of the National Stock Exchange, and some other ECNs like Archipelago increase competition in NASDAQ trading without a formal affiliation with the exchange. Retrieved from <http://www.investordictionary.com/definition/ECN.aspx> on August 30, 2005.

twice as fast.²⁵ In addition, NASDAQ trading is less vulnerable to disruptions from violent events. More important, the differences in the way the two exchanges operate also affects the costs of trading for investors, in ways which demonstrate the superior efficiency of electronic trading for most classes of securities.

The key measure of this efficiency involves market liquidity, or an investor's ability to buy or sell shares whenever he chooses, at the price other investors will pay or receive. In markets that do not provide sufficient liquidity, an investor offering to buy or sell shares may have to drive up the price to attract sellers or drive down the price to attract buyers. The most reliable measure of this liquidity is the "average effective spread" for market orders, based on the difference between the actual price of the trade and the midpoint between the best bid and best offer. This represents the additional cost an investor incurs, per-share, to transact a trade immediately.²⁶ Based on data collected under SEC Rule 11Ac1-5, the electronically-based trading system produces narrower spreads for most classes of securities than a floor-based, specialist trading system. Much of these differences reflect the competition in executing trades created by an open-access electronic platform, even more than the efficiency of the technologies comprising that platform.

Table 1. Average Effective Spreads, By Share Price and Company Size, May 2004²⁷

Price	NYSE	NASDAQ	% Difference
S&P 500 – Large Cap Companies			
< \$5	0.95	0.44	53.7%
\$5 - \$15	1.17	0.67	43.0%
\$15 - \$25	1.38	0.81	41.1%
\$25 - \$50	1.83	1.09	40.5%
> \$50	2.63	2.12	19.3%
S&P 400 – Mid Cap Companies			
< \$5	1.66	1.05	36.9%
\$5 - \$15	1.74	1.06	39.5%
\$15 - \$25	1.87	1.95	(-3.9%)
\$25 - \$50	2.71	2.60	4.2%
> \$50	4.03	3.98	1.2%
S&P 600 – Small Cap Companies			
< \$5	2.01	1.76	12.0%
\$5 - \$15	2.54	2.21	13.1%
\$15 - \$25	2.83	3.14	(-10.9%)
\$25 - \$50	3.67	3.81	(-3.9%)
> \$50	5.22	6.60	(-26.4%)

²⁵ Robert Shapiro, *op. cit.*

²⁶ Harris, Larry, *op. cit.*, p. 71.

²⁷ Market Systems, Inc., May 2004, SEC Rule 11Ac1-5 data (all marketable orders under 10,000 executed shares). We performed the same analysis for trades over October 2003 and April 2004, and found similar patterns.

Numerous researchers have found that when investors buy and sell shares, especially in companies with large market capitalization, the spreads are smaller using an electronic-trading platform.²⁸ Our own analysis of the data (Table 1, above) supports and extends this conclusion: An electronic-trading platform gives investors the ability to trade immediately at substantially less cost – much smaller average effective spreads – in stocks of large-cap firms of any price, in stocks of most mid-cap firms, and in stocks of less expensive small-cap firms. The specialist-based system is more efficient only for a subset of trades in the most expensive small-cap firms and mid-priced, mid-cap firms.²⁹

These cost advantages help explain how the electronically-based NASDAQ has come to compete so successfully with the NYSE, despite the NYSE's long-entrenched position. The NYSE still leads the electronic market in terms of the average size of companies listed and IPOs executed. But the NASDAQ lists more companies, executes more daily trades of more shares, and conducts more IPOs than the less-efficient NYSE. The most compelling evidence of the competitive advantages of an electronically-based exchange, however, is the NYSE's own plans to move in that direction.

IV. The NYSE Hybrid Model: Can Specialists Survive in an Electronic System?

In April 2005, the world's largest floor-based stock exchange, the NYSE, announced plans to supplement its basic specialist trading system with an expanded, electronically-based platform to operate alongside its traditional specialist platform. The impetus for implementing this "hybrid model" was three-fold. First, the superior speed and spreads of an electronic platform represent a long-term threat to the NYSE's core business -- especially since the leading U.S. electronic exchange, NASDAQ, embarked on a campaign to persuade NYSE-listed companies to dual-list on the NASDAQ.³⁰ Second, the capacity of ECNs to trade securities listed on any exchange, and their growing market, poses an additional competitive challenge for a floor-based exchange like the NYSE. Finally, two weeks before the NYSE announced its new plans, the SEC adopted Regulation NMS for the "National Market System," extending the "trade through" or "order protection" rule that requires all orders be filled on whatever exchange offers the "best price."

The new regulation presents a major, new challenge for non-electronic exchanges using specialists, because it takes about twice as long to process a "buy" or "sell" order through a floor broker and specialist, as it does through an electronic-trading system. By the time an order

²⁸ See, for example, www.wallstreetandtech.com. The most prominent studies claiming to show that average spreads for trades are larger on the NASDAQ than the NYSE – up to 50 percent larger – come from the NYSE itself. Our analysis found that these studies are all seriously flawed. See Shapiro, *op. cit.*

²⁹ See also Kee H. Chung, Bonnie Van Ness and Robert Van Ness, "Trading Costs and Quote Clustering on the NYSE and NASDAQ After Decimalization," *Journal of Financial Research*, Vol. 27, No 3., September 2004.

³⁰ NYSE companies that have chosen to dual list include Charles Schwab, Hewlett Packard, Walgreen's, Apache, Cadence Design Systems, Countrywide Financial, American Financial Group and the Chicago Mercantile Exchange, with combined market value of nearly \$200 billion (October 6, 2005).

reaches the specialist, the price may have changed; and when that happens, the broker has to resubmit the unfilled order at a higher price. Under the new trade-through rule, the NYSE could lose those delayed trades – potentially millions of orders -- even if it offered the best price, because the SEC stipulated that the new regulation applies only to “fast” or electronic markets. As a consequence, the NYSE could not fully compete under the National Market System unless it adopted a platform that would post its quotes electronically.³¹ The new SEC regulations further encouraged the NYSE to adopt an electronic-trading platform through additional new rules for “market data and plans” which will sharply reduce revenues arising from the sale of market data based on manual quotations.³²

Within two weeks of the new SEC regulations, the NYSE announced its plans to merge with Archipelago Holdings Inc. (Archipelago), an ECN that handles trades on a purely electronic platform.³³ In addition, Archipelago’s recent acquisition of the Pacific Stock Exchange also gives the NYSE access to the options market.³⁴ Investors quickly endorsed the transition towards an electronic model, bidding up the price of a seat on the NYSE by 68 percent.³⁵

The NYSE hybrid market allows investors to choose to execute their orders through the electronic platform or through the old specialist system, based on their trading strategy and the characteristics of their orders. However, the NYSE’s attempt to combine the slower-paced, floor-based specialist market with the faster-paced, electronic market includes several very problematic features, apparently intended to protect the specialists’ business. To begin, the new hybrid market allows specialists to place buy or sell orders that are not displayed publicly, called “agency interest files.” In this respect and some others, the hybrid resembles the “upstairs market” of some European electronically-based exchanges, such as the Paris Bourse, in which large institutions can route the sale or purchase of large blocs of a stock to special brokers who locate counterparties and privately negotiate the terms of the trade.³⁶ In Europe, these upstairs markets can tap into pools of hidden liquidity, improving overall market efficiency.³⁷ But they also allow

³¹ Gary Osten and Jim Kharouf, “The Big Board Gets Wired: Reg NMS Fuels Stock Market Consolidation,” *Stocks, Futures & Options*, June 2005, Volume 200, Volume 4, No. 6, www.sfomag.com. Another impetus may have been scandals involving improper behavior by NYSE specialist firms. In April 2003, *The Wall Street Journal* revealed an ongoing SEC investigation of widespread trading violations by major NYSE specialist firms, and in 2004, the seven largest firms were directed to disgorge \$158 million in improper profits and pay civil penalties of \$89 million. In Spring 2005, 15 specialists were also indicted for illegal trading activities. See Kate Kelly and Susanne Craig, “Big Board is Probing Specialists For Possible ‘Front Running,’” *The Wall Street Journal*, April 17, 2005; “Settlement Reached with Five Specialist Firms for Violating Federal Securities Laws and NYSE Regulations,” March 30, 2004, www.sec.gov/news/press/2004-42.htm; and “Settlement Reached With Two Specialist Firms for Violating Federal Securities Laws and NYSE Regulations,” July 26, 2004, www.sec.gov/news/press/2004-99.htm. Also, David Dreman, “The Dinosaur at Wall and Broad,” *Forbes*, June 6, 2005, Vol. 175, Issue 12, p. 180.

³² www.wallstreettech.com.

³³ Ivy Schmerken, “May the Best System Win,” *Wall Street & Technology*, www.wallstreetandtech.com.

³⁴ Gail Osten and Jim Kharouf, “The Big Board Gets Wired: Reg NMS Fuels Stock Market Consolidation,” *Stocks, Futures & Options*, June 2005, Volume 4, No. 6, www.sfomag.com.

³⁵ Shawn Tully, *op. cit.* pp. 28-29.

³⁶ This route is often selected to ensure that large blocs of a stock do not fall into the hands of a rival company.

³⁷ Kumar Venkataraman and Henrik Bessembinder, “Does the electronic stock market need an upstairs market?”,

large transactions to be executed outside the quotes, a practice not permitted in American markets. In the NYSE case, these features will allow NYSE specialists to use their own -- not hidden -- liquidity resources to preserve their large-bloc business and, unless the SEC closely monitors the “agency interest files,” trade outside the quotes. The NYSE hybrid further protects the specialists’ business and restricts investors’ access to electronic trading by stipulating that whenever a company’s stock price shifts during any 30-second period by the greater of 25-cents or one percent of the stock price, all transactions in the stock shift back to the specialist-auction platform. The NYSE claims these provisions are needed to limit volatility. But a stock price will move sharply whenever investors learn important new information, which is almost the definition of a market. At a minimum, all of these hybrid features add levels of complexity and non-transparency that hinder efficient markets and open competition.³⁸

Other exchanges have tried hybrid models, and the result has typically been a steady expansion of the electronic platform and steady erosion of the auction market. The Chicago Mercantile Exchange (CME), for example, added an electronic-trading alternative, Globex, to its auction system in 1992, and still offers its “open outcry” auctions” at headquarters alongside an electronic platform that allows investors to trade offsite.³⁹ From 2000 to the first half of 2005, the share of CME contracts executed through the Globex platform has soared from 15 percent to almost 70 percent.⁴⁰ The superior efficiency of the electronic platform is also clear from the revenue streams: CME earns 60 percent more revenue from a trade on Globex than from one on the floor, earning CME pre-tax profits of almost 50 percent in 2005.⁴¹

The NYSE’s own prior experience with electronic trading also suggests a gradual withering away of the traditional system for executing trades. Before the merger with Archipelago, the NYSE allowed investors to trade electronically using the NYSE’s “Direct+” platform on orders involving less than 1,100 shares, for accounts that had not placed an electronic order within 30 seconds.⁴² Even with these restrictions, the share of NYSE trades executed through Direct+ grew more than five-fold from 2001 to 2004: Direct+ transactions accounted for 1.9 percent of NYSE volume in 2001 (an average of 22,595,251 shares per-day) and 10.1 percent in 2004 (an average of 140,587,853 shares per-day).⁴³ If the NYSE offered investors a simple choice without special provisions to channel trading to the specialist platform, the result would be much the same as it was for the CME: In short order, electronic platform would claim the vast majority of trades.

Journal of Financial Economics, July 2005.

³⁸ Gregory Bresiger, “Bang Raps the NYSE’s Hybrid Plan,” *Traders Magazine*, July 1, 2005.

³⁹ www.cme.com.

⁴⁰ *Ibid.*

⁴¹ Will Acworth, “New Directions in Exchange Strategy,” *Outlook 05*, www.futuresindustry.com. CME’s high profits on transacting futures contracts electronically have not gone unnoticed: In June 2005, Eurex challenged CME with a system for trading foreign exchange futures, including a waiver on all trading fees for foreign exchange contracts for the rest of 2005.

⁴² “The NYSE Hybrid Market,” www.nyse.com/pdfs/hybrid_update.pdf.

⁴³ Peter Bennett, “End of the road or new beginning for NYSE Specialists,” www.exchange-handbook.co.uk.

V. Conclusion

The future for security exchanges seems clear. The strong trends towards electronic-trading platforms, exchange consolidation, and demutualization all point to financial exchanges in the future that trade instruments across asset classes, from around the world, and around the clock. With greater resources and economies of scale, these exchanges should continue to adopt new technologies that can further narrow spreads, reducing trading costs. With greater integration of assets and markets, both competition and liquidity should also increase, benefiting investors and companies. Efforts to protect the traditional, specialist-based arrangements -- much like tariffs or quotas to shield inefficient industries from market competition -- should not be permitted to delay or derail these potentially major improvements in the efficiency of national and global asset markets.

About the Author

Robert J. Shapiro is the co-founder and chairman of Sonecon, LLC, a private firm that advises U.S. and foreign businesses, governments and non-profit organizations on market conditions and economic policy. Dr. Shapiro has advised, among others, U.S. President Bill Clinton and British Prime Minister Tony Blair; private firms such as MCI, Inc., New York Life Insurance Co., SLM Corporation, Nordstjernan of Sweden, and Fujitsu of Japan; and non-profit organizations including the American Public Transportation Association, the U.S. Chamber of Commerce, and PhrMA. He is also Senior Fellow of the Progressive Policy Institute, Economic Counselor to the Conference Board, and director of the Ax:son-Johnson Foundation in Sweden, the Center for International Political Economy in New York, and USA for Innovation in Washington, D.C. From 1997 to 2001, Dr. Shapiro was U.S. Under Secretary of Commerce for Economic Affairs. In that position, he directed economic policy for the Commerce Department and oversaw the Nation's major statistical agencies, including the Census Bureau while it carried out the 2000 decennial census. Prior to that appointment, he was co-founder and Vice President of the Progressive Policy Institute and the Progressive Foundation. He also was principal economic advisor in Governor Bill Clinton's 1991-1992 presidential campaign and senior economic advisor to Vice President Albert Gore in his 2000 presidential campaign. Dr. Shapiro also served as Legislative Director for Senator Daniel P. Moynihan, Associate Editor of *U.S. News & World Report*, and economic columnist for Slate. He has been a Fellow of Harvard University, the Brookings Institution, and the National Bureau of Economic Research. He holds a Ph.D. from Harvard University, a M.Sc. from London School of Economics, and an A.B. from the University of Chicago.