Swarthmore College

Works

Economics Faculty Works

Economics

2004

The Philadelphia Stock Exchange: Adapting To Survive In Changing Markets

John P. Caskey

Swarthmore College, jcaskey1@swarthmore.edu

Follow this and additional works at: <https://works.swarthmore.edu/fac-economics>

Part of the [Economics Commons](#)

[Let us know how access to these works benefits you](#)

Recommended Citation

John P. Caskey. (2004). "The Philadelphia Stock Exchange: Adapting To Survive In Changing Markets". *Business History Review*. Volume 78, Issue 3. 451-487. DOI: 10.2307/25096909
<https://works.swarthmore.edu/fac-economics/1>

This work is brought to you for free by Swarthmore College Libraries' Works. It has been accepted for inclusion in Economics Faculty Works by an authorized administrator of Works. For more information, please contact myworks@swarthmore.edu.

The President and Fellows of Harvard College

The Philadelphia Stock Exchange: Adapting to Survive in Changing Markets

Author(s): John P. Caskey

Source: *The Business History Review*, Vol. 78, No. 3 (Autumn, 2004), pp. 451-487

Published by: [The President and Fellows of Harvard College](#)

Stable URL: <http://www.jstor.org/stable/25096909>

Accessed: 17/07/2014 14:21

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at
<http://www.jstor.org/page/info/about/policies/terms.jsp>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

The President and Fellows of Harvard College is collaborating with JSTOR to digitize, preserve and extend access to *The Business History Review*.

<http://www.jstor.org>

John P. Caskey

The Philadelphia Stock Exchange: Adapting to Survive in Changing Markets

This article analyzes the evolution of the Philadelphia Stock Exchange (PHLX), America's oldest stock exchange, from 1950 through 2000. PHLX was able to compete against the much larger New York Stock Exchange (NYSE) because it exploited loopholes created by fixed minimum trading commissions prior to 1975. After the liberalization of commissions, the PHLX competed against the NYSE by offering automated executions that met the needs of discount brokers. It also moved early to trade equity options and developed the first exchange-based market for foreign currency options.

The evolution of the Philadelphia Stock Exchange (PHLX) during the second half of the twentieth century constitutes a compelling story for several reasons. For one, very little has been written about the regional stock exchanges, and even many financial economists are uncertain about what they do and why they do it. By focusing on one particular regional exchange, I can provide a rich account of its operations and business strategies. At the same time, since most of the other surviving regional exchanges shared many of the characteristics of the PHLX, an account of its evolution provides a perspective on the

JOHN P. CASKEY is professor in the Department of Economics at Swarthmore College.

I conducted much of the research for this paper while I was a visiting scholar in the Research Department of the Federal Reserve Bank of Philadelphia. I am grateful to that institution for its support. I also thank three anonymous referees for their helpful comments. In conducting the background research for this paper, I greatly benefited from insights provided by George Arnold, Albert Brinkman, Eleanor Myers, Lisa Polsky, Joseph Rizzello, Arnold Staloff, Bill Terrell, and four individuals who served as chief executives of the PHLX during the period examined in this paper: Elkins Wetherill (1965–1981), Nicholas Giordano (1981–1997), Leopold Korins (1997–1998), and Meyer S. Frucher (1998–present). I thank the staff of the PHLX, and Joseph Keslar in particular, for providing me with access to the minutes from the 1961–85 meetings of the PHLX board of directors. These individuals and institutions are not, or course, responsible for any errors in this paper and they do not necessarily agree with my account of the factors involved in the evolution of the PHLX.

Business History Review 78 (Autumn 2004): 451–487. © 2004 by The President and Fellows of Harvard College.

development of the regional exchanges generally. In addition, an analysis of the progressive transformation of the PHLX necessarily entails background profiles of the many profound changes in the structure of securities markets that occurred in the second half of the twentieth century. Finally, the evolution of the PHLX is in itself a fascinating case study of business strategy and adaptation to major competitive and regulatory shocks.

In examining this half-century in the history of the PHLX, I identify three distinct periods. The first runs from the 1950s through 1974. I begin in the 1950s in order to capture the postwar characteristics of the regional stock exchanges and the challenges they faced in attracting orders away from the New York Stock Exchange. I end the first period in 1974, because this is the last year that exchanges could, and did, specify minimum commissions that nonmembers had to pay in order to trade on the exchanges. In addition, during this period, the PHLX only traded equities, not the options that became important to it in later years. The second period begins in 1975 and ends in 1983. This is an era of great innovation for the PHLX, as it introduced automated routing and execution of retail equity trades and began to trade equity options, equity index options, and foreign-currency options. The third period runs from 1984 through 2000. During this era, while the PHLX enjoyed the benefits of its earlier diversification into options, it also had to confront new regulatory and competitive threats to the successful market niches it had created.

Before telling the story of the evolution of the PHLX, I will explain a recurring theme in this account. Economic theory would tend to predict that there would be only one exchange to trade any particular security or group of securities, in large part because securities markets are subject to "network effects."¹ This simply means that people buying (or selling) a security will generally want to go to the market center where the largest number of others are selling (or buying) the same security. By following this strategy, they maximize their chances of receiving the best price and completing the transaction quickly. This point, which is often summed up by the phrase "liquidity attracts liquidity," has important implications. If an exchange, for example, gains a dominant market share in trading a particular security, all trading of the security may quickly move to that market. In other words, network effects can create natural monopolies for securities exchanges. In determining which exchange becomes the location for trading a particular security, there is

¹ For a clear, nontechnical discussion of network efforts in trading systems and factors affecting competition among markets, see Larry Harris, *Trading and Exchanges: Market Microstructure for Practitioners* (New York, 2003).

a “first mover” advantage. The exchange that first gains a dominant market share, perhaps because it is the first to trade the security, is more likely to become the monopoly center than later entrants.

Over the course of the half-century that I examine here, the Philadelphia stock exchange managed to survive, and sometimes to thrive, while capturing only a relatively minor share of total national trading of exchange-listed stocks and equity options. If network effects are significant, one would expect it to have folded as trading migrated to far larger market centers, such as the New York Stock Exchange (NYSE) for exchange-listed equities and the Chicago Board Options Exchange for exchange-traded options. Why didn’t this happen?

In what follows, I explain how the PHLX was able to compete against these much larger rivals. But to summarize the answer at the outset, a number of factors came into play, including high communication costs in the PHLX’s earliest years; restrictive membership and listing standards on the NYSE; efforts by institutions to evade fixed trading commissions; a differentiation of trading technologies to appeal to particular order-flow providers; government regulations and, perhaps, implicit collusion among exchanges that allowed them to monopolize the trading of specific equity option contracts; and the development of new products that were not traded on other exchanges. All these factors have, at different times, accounted for the ability of the PHLX to overcome the network effects that would otherwise undermine the ability of a small securities exchange to coexist alongside much larger exchanges.²

Before exploring the three distinct eras in the history of the PHLX outlined above, I will set the context for the 1950s by briefly reviewing the evolution of the PHLX prior to that time.

The Early Years

The Philadelphia Stock Exchange dates its founding to the 1790 licensing of the Philadelphia Board of Brokers, making it the oldest stock

² For a theoretical discussion of sources of competitive advantage and the implications for business strategies, see Michael E. Porter, *The Competitive Advantage of Nations* (New York, 1990). Porter also provides numerous case studies from a variety of countries to support his theory of competitive advantage. One can easily apply the theory to competition among securities markets, but the factors emphasized in the theory should be modified in two ways to fit this industry more closely. First, where Porter emphasizes geographic clustering that can result from agglomeration economies, in securities markets it is the network effects that promote the clustering of trades within a single market center. Second, competition within securities markets and the structure of those markets are heavily shaped by government regulations.

exchange in the country.³ Between its founding and the mid-nineteenth century, the Philadelphia exchange mainly traded government debt and the securities of local banks, insurance companies, and bridge and turnpike companies.⁴

Although the New York Stock Exchange was founded about two years after the PHLX, it soon surpassed the PHLX in trading volume. As the legal historians Walter Werner and Stephen Smith write, “Reliable comparisons for the trading years 1837–1840 reveal that reported share volume in Philadelphia was on average 13.9 percent of the volume in New York. . . .”⁵ The prominence of the NYSE was due to New York’s preeminent position in commerce generally. New York, unlike Philadelphia, was linked to the Great Lakes region as a result of the 1825 completion of the Erie Canal, and its ports were better positioned for shipping back and forth to Europe.

Over the course of the nineteenth century, an increasing share of the trading in financial securities, especially transactions carried out by the largest firms or government entities, migrated to the NYSE because of the liquidity and depth of that market. But relatively high communication costs enabled the regional exchanges to compete in the first half of the century. Philadelphians could not quickly discover the prices of securities trading in New York, nor could they quickly transmit trade orders to that city. In other words, communication costs offset the tendency for the trading of securities to become concentrated in one market center, clearing a space for regional securities exchanges to flourish.

By the 1850s, the United States was actively engaged in developing a national telegraph network, which facilitated the creation of large national corporations that sought to list their securities on the NYSE because they were attracted by the deep pools of capital in New York

³ Over the years, the Philadelphia Stock Exchange has had a variety of names and office locations. But it has always been located in Center City Philadelphia, with one exception. In December 1968, in response to a fiscal crisis, Philadelphia imposed a \$0.05 per share stock-transfer tax for all transactions on the PHLX. On January 2, 1969, the PHLX moved its trading floor to an office building just across the street from the city boundaries to avoid the tax. In February, a court ruled that the tax was illegal, and the PHLX moved its trading floor back to its headquarters in the city.

⁴ For data on the volume of trading prior to the 1850s, the types of securities traded, and the typical brokerage commissions, see Robert E. Wright, *Hamilton Unbound: Finance and the Creation of the American Republic* (Westport, Conn., 2002). Prior to the twentieth century, bonds and preferred stocks were more widely traded on securities exchanges than were common stocks. Trading and ownership of equities were limited by poor accounting standards and confusion about how to value equities. For a good exposition of the evolution of securities markets generally between 1800 and 1940, see Jonathon Barron Baskin and Paul J. Miranti Jr., *A History of Corporate Finance* (New York, 1997).

⁵ Walter Werner and Steven T. Smith, *Wall Street* (New York, 1991), 184.

City.⁶ The development and deployment of the ticker tape during the 1870s further reinforced the tendency to trade in New York, since it allowed brokers located anywhere in the country nearly contemporaneous access to stock prices as they were posted on the NYSE.

Regional exchanges, including the PHLX, responded to the success of the NYSE by setting less demanding listing standards than those required by the NYSE. This enabled younger and smaller firms with publicly held securities that were unable to meet the listing requirements of the NYSE to benefit from an organized secondary market. Such a firm's typical path to success would be to list its securities on a regional exchange located close to its headquarters or close to a majority of its shareholders. Once the firm reached sufficient scale and its securities became sufficiently widely held, it would list on the NYSE. In some cases, the firm would continue to list its securities on the regional exchange even after listing on the NYSE, especially if a large share of its securities were owned by individuals or institutions located near the regional exchange. The process of listing securities on a regional exchange first in anticipation of eventually moving to the NYSE was known as "seasoning."⁷ Under this system, the exchanges outside New York tended to trade the securities of the firms that dominated their regions. In the case of the PHLX, trading toward the end of the nineteenth century emphasized the securities of rail systems, mining companies, insurance firms, and local banks.⁸

The "Blue Sky" laws that many states enacted in the early twentieth century provided an additional incentive for firms to list their securities on a regional exchange. These laws offered some protection against fraud by requiring that securities sold within a state be registered with that state's relevant agency, but states commonly exempted firms whose securities were listed on an organized exchange from this registration process. The exemption created a strong incentive for firms that were unable to meet NYSE listing standards to list their securities on a regional exchange in order to avoid the costs of registering their securities in multiple states.

⁶ For a rich account of how the telegraph influenced U.S. financial markets, see Richard B. DuBoff, "The Telegraph and the Structure of Markets in the United States, 1845–1890," *Research in Economic History* 8 (1983): 253–77.

⁷ A contemporary financial writer explained, "In general the exchanges outside of New York City deal in local securities. In a sense they serve the New York Stock Exchange in somewhat the same manner as does the Curb in trying out new securities. Enterprises which at the outset appear as local in scope expand to national proportions and when they do so they gravitate to New York." Albert W. Atwood, *Modern Business*, vol. 20 (New York, 1918), 32.

⁸ For an explanation of the relatively late development of secondary markets in industrial securities, see Thomas R. Navin and Marian V. Sears, "The Rise of the Market for Industrial Securities, 1887–1902," *Business History Review* 20 (Spring 1955): 105–38.

The major regional exchanges, including the PHLX, boomed in the 1920s as listings and trading increased rapidly.⁹ In 1923, for example, 2.3 million shares were traded on the PHLX, about 1 percent of the volume of the NYSE. By 1929, 35.5 million shares were traded on the PHLX, or about 3.1 percent of NYSE volume.

In the subsequent stock-market crash and economic depression, many of the firms listed on the regional exchanges failed or were absorbed in mergers, and trading volume fell precipitously. In 1932, for example, only 6.6 million shares traded on the PHLX. In addition, states changed their Blue Sky laws to limit exemptions for securities listed on regional exchanges, and the newly created Securities and Exchange Commission (SEC) required the exchanges to impose stricter listing requirements. These developments greatly decreased listings and trading volume on the regional exchanges.¹⁰ Gradually the over-the-counter (OTC) market replaced the regional exchanges as the location where newly issued equities would trade and become seasoned before the issuing firm might seek a listing on the NYSE or the American Stock Exchange (AMEX), then known as the Curb Exchange.

As the regional exchanges lost listings and trading volume, they responded by starting to trade securities listed on the NYSE and, to a lesser extent, on the AMEX. In 1931, for example, the PHLX allowed trading to begin in any security listed on the NYSE, the AMEX, and some regional exchanges. Since these securities were generally not listed on the PHLX, this was called “unlisted” trading. Not surprisingly, the NYSE challenged the move by the regional exchanges to trade securities listed on the NYSE, but in a series of decisions during the 1930s, the SEC decided in favor of the regional exchanges.¹¹ Within a decade, the PHLX and the other regional exchanges were mainly trading securities listed on the New York exchanges. By 1948, for example, only 1.5 percent of the dollar volume of stock trading on the PHLX was in securities listed only on that exchange.¹² The majority of stocks traded on the PHLX were listed on the NYSE.

⁹ The data in this and the subsequent paragraph are found in U.S. Securities and Exchange Commission, *Report of the Special Study of Securities Markets of the Securities and Exchange Commission* (Washington, D.C., 1963), part 2, 916-17.

¹⁰ In its 1963 study, the SEC explained that “since the disclosure standards of the new statute exceeded the equivalent standards of the principal exchanges, companies meeting these standards might well seek the greater publicity and prestige of a listing on the New York exchanges in preference to a regional listing The new statutory requirements . . . also tended to shift the trading of securities from the regional exchanges to the over-the-counter market. . . . [S]ecurities traded over the counter were free of the requirements now attached to securities traded on an exchange.” SEC, *Special Study*, part 2, 918.

¹¹ *Ibid.*, 919-24.

¹² U.S. Securities and Exchange Commission, *Eighteenth Annual Report* (Washington, D.C., 1953), 37.

The Fixed-Commission Era: 1950–1974

Since the PHLX was mainly trading the same stocks as the NYSE in the 1950s and the NYSE had a much greater volume of business, why would brokers route some trades to the PHLX rather than to the NYSE? Initially much of the business resulted from the retail trades of regional brokerage firms that were not members of the NYSE. In the 1960s, mutual funds directed trades to the regional exchanges to reward brokerage firms that were not members of the NYSE but that sold shares in the mutual funds. Institutions also directed trades to the PHLX, because it had created means for institutions to evade exchange-specified minimum public trading commissions.

Before discussing the reasons that orders came to the PHLX, however, it is important to explain how the floor of the PHLX functioned. As the PHLX evolved into an exchange that mainly traded equities listed on the NYSE, it also came to resemble more closely a dealer market than an auction market. This was also true of the other regional exchanges. In most cases, the only person buying or selling a particular stock on the floor of the exchange was the designated specialist. There were no competing market makers on the floor, and it was very rare for brokers representing buy-and-sell orders to interact directly.¹³ The counterparty to almost all trades was the specialist.¹⁴ The specialist's profits depended on the spread between his bid and ask price, multiplied times the volume of his trades. Because the specialists on the PHLX were smaller, more poorly capitalized operators than their counterparts on the NYSE, they typically sought to execute a steady flow of small retail orders.

While the specialists on the PHLX rarely faced competition for orders from the floor of the exchange, they did compete to attract trades in equities that were traded on other exchanges. To attract this order flow, the specialists would generally guarantee that their prices would be as good, or nearly as good, as those quoted on the NYSE. This practice was common on the regional exchanges. As the SEC explained in its

¹³ In some cases, brokers on the floor would execute large orders with each other, but they generally negotiated these trades off the floor of the exchange. Brokers would execute the prearranged trade, known as a "cross," on the PHLX or another regional exchange rather than the NYSE, because there were far fewer limit orders on the books of the regional exchanges. The exchanges require that limit orders that offer better prices, or that were entered earlier with prices identical to the block transaction, be executed as part of the block transaction. A large backlog of limit orders can therefore fragment and complicate a block transaction.

¹⁴ Although the SEC did not provide data specifically for the PHLX, in discussing securities traded on the NYSE or the AMEX that were also traded on a regional exchange, it stated, "The specialist participates as a dealer in approximately 90 percent of all multiple trading on the regional exchanges." SEC, *Special Study*, part 2, 932.

1963 study, the regional exchanges sought “to assure investors as good an execution on the regional exchange as they might receive on the principal market. This led to the development of systems to gear prices on the local exchange to those reported on the NYSE ticker tape.”¹⁵ In discussing how this system operated on the PHLX, the SEC noted that a specialist would sometimes transact at a price that was one-eighth (\$0.125) lower than the last printed transaction price on the NYSE. Brokers who directed orders to these specialists did not consider this to be a breach of fiduciary responsibilities to their customers. They reasoned that “had the order been sent to New York, there is no certainty that the quote is the market in which the customer would have dealt since there might have been orders ahead of his or the market might have changed by the time his order arrived.”¹⁶ In a limited set of cases, a specialist on the PHLX would match the price quoted on the NYSE. As the SEC reported in its 1963 study:

If there are a great many “prints” of GM at 56 on the NYSE tape the [PHLX] specialist will execute the order at 56 without waiting for the stock to sell in New York at 56 1/8. The transaction “on volume” will occur when the volume of sales in New York at the limit price is such as would indicate that the firm can receive an execution at 56 in New York.¹⁷

Brokers directed orders for securities listed on the NYSE to the PHLX for a variety of reasons. Small and medium-sized brokerage firms with their headquarters in the mid-Atlantic region were often members of the PHLX but not the NYSE, since membership in the PHLX required far less capital. If such firms received an order to trade a security listed on the NYSE and they directed it to a member of the NYSE for execution, they would have to pay the “public” fixed commission required of all nonmembers.¹⁸ This would reduce or eliminate any profit they

¹⁵ Ibid., 915.

¹⁶ Ibid., 934.

¹⁷ Ibid.

¹⁸ Members of an exchange pay a small commission to the exchange for all trades that they execute on the floor of the exchange. This commission helps cover the overhead costs of the exchange. Nonmembers who wish to trade on an exchange must ask a member to execute the trade on their behalf. The nonmembers pay the member a “public” commission for handling the trade. Prior to 1975, all of the exchanges required their members to charge a specified minimum public commission. Since this was higher than what a free-market commission would have been, all members charged the specified minimum commission and did not compete for orders on the basis of price. The minimum public commission was specified on a per share basis, so large-volume institutional traders paid the same commission per share as small retail traders. In addition, with only minor exceptions, all the exchanges specified identical minimum public commissions. SEC, *Special Study*, part 2, 299–300. An investor could avoid paying the minimum commission by directing a trade in a listed security to an over-the-counter dealer who made a market in that stock. But rule 394 of the NYSE prohibited

would gain from originating the order. If such firms, on the other hand, executed the order on the PHLX, they could keep most of the public commission paid by their customers, paying only a minor member commission to the PHLX.

Firms that were solely members of the PHLX would direct some orders to the NYSE, either because of the large size of the trade or because the security was not traded on the PHLX. They would have to choose a NYSE member to execute these orders on their behalf and pay the public commission. Because the cost to a member of executing an order on the NYSE was far below the minimum public commission, members competed aggressively to attract orders from outsiders. The NYSE did not permit its members to discount public commissions or offer cash rebates in competing to attract orders, but the members could reward outside brokerage firms that belonged to a regional exchange by sending them orders to execute on the regional exchange. In this way, the brokerage firm that belonged only to a regional exchange could indirectly earn public commissions for handling orders that it directed to a NYSE member. Such orders were referred to as "reciprocal" order flow, and they accounted for a significant share of the trades directed to the PHLX and other regional exchanges prior to the liberalization of public commissions.

The best-capitalized firms that were members of the PHLX often also belonged to the NYSE. In research conducted for its 1963 study, the SEC surveyed forty-one of these firms to ask them why they would direct some of their order flow to the PHLX rather than to the NYSE. About half of the firms cited one reason as the most important: "to retain a larger percentage of the commission."¹⁹ This reason was likely mentioned by dual members that did not have execution and clearing facilities in New York, which meant that they would have to pay another member of the NYSE to handle these tasks.²⁰ Another common reason that the firms gave for directing orders to the PHLX was "to save paying the New York State transfer tax." At that time, New York imposed a graduated tax on the trading of stocks. For stocks that traded for \$20 or more per share, the tax was \$0.04 per share traded. Pennsylvania had no such tax. Thirteen of the forty-one firms said they directed

member firms from routing trading orders for listed stocks to OTC dealers. They were not, however, prevented from routing trades to regional exchanges. Rule 394 also prohibited NYSE member firms from acting as OTC dealers for listed securities. The effect of these rules was to limit access to the "third market" to institutional investors with the necessary technology to communicate directly with OTC market makers and to compare the prices on the third market to those on the NYSE.

¹⁹ SEC, *Special Study*, part 2, 1086.

²⁰ *Ibid.*, 938.

some trades to the PHLX to “reduce market impact on the NYSE.” These firms were undoubtedly breaking up block orders. Several dual-member firms reported that they directed trades to the PHLX as part of a reciprocal arrangement with another member of the PHLX. Finally, ten of the forty-one dual members said they directed some trades to the PHLX because of “orders originating in the vicinity of the exchange.” Most likely they were referring to a desire by some Philadelphia-area investors, bank trust departments, and brokerage firms to support local business interests.²¹

While securities markets were no longer regional by the 1950s, the NYSE-listed securities of large Philadelphia-area firms accounted for a disproportionate share of trades on the floor of the PHLX in the early 1960s. Undoubtedly, the explanation for this circumstance is that ownership of firms in the Philadelphia area, especially at the retail level, was more concentrated in this region than elsewhere. When these owners traded their shares, they were more likely to use regional brokerage firms that were members of the PHLX. Between 1962 and 1964, for example, the ten most actively traded stocks on the PHLX in one or more of these years included the Philadelphia Electric Company, the Scott Paper Company, the Sperry Rand Corporation, the Pennsylvania Railroad Company, and the Philadelphia Transportation Company.²² All of these companies were based in the Philadelphia metropolitan region.

Despite the shift during the 1930s toward the trading of securities listed on the NYSE and AMEX, most of the regional exchanges experienced a consistent decline in their market share of total exchange-listed trading between 1930 and 1960. Many of the regional exchanges either closed or merged with others during this period.²³ The PHLX was no exception. In 1949 it merged with the Baltimore exchange, and in 1953 it merged with the Washington, D.C., exchange. In both cases, the PHLX was the far larger entity, and the surviving exchange maintained its headquarters in Philadelphia. Despite these mergers, the dollar volume of equity trading on the PHLX was quite low in the early 1950s

²¹ In the late 1940s, the PHLX created a public relations committee to encourage Philadelphia-area financial institutions to direct trades to the PHLX in order to benefit the local economy. Apparently some institutions cooperated. The vice-president of a local trust bank stated, “We have encouraged our brokers to place as many of our orders as possible on the P-BSE [Philadelphia-Baltimore Stock Exchange].” James E. Walter, *The Role of Regional Security Exchanges* (Berkeley, 1957), 127.

²² Philadelphia-Baltimore-Washington Stock Exchange, *Annual Report*, 1962 through 1964.

²³ For a detailed analysis of the economic forces behind the mergers of the regional exchanges between 1940 and 1960, see Tom Arnold, Philip Hersch, J. Harold Mulherin, and Jeffery M. Netter, “Merging Markets,” *Journal of Finance* 54 (June 1999): 1083–107.

Figure 1. PHLX dollar volume of equity trading. Source: annual reports of the SEC.

(see Figure 1).²⁴ It picked up in the latter half of the 1950s, but this was largely due to a general increase in the volume of trading overall. During the 1950s, the market share that the PHLX had in exchange-traded equities hovered fairly consistently around 1 percent.²⁵ In 1960, the four largest regional exchanges had a combined market share of only 6.15 percent. It is no wonder that the 1963 SEC study questioned the survival prospects of the regional exchanges.

Shortly after the SEC issued its 1963 report, the flow of orders to the PHLX began to grow rapidly. The dollar volume of shares traded on the PHLX grew markedly from 1962 to 1969, and it grew explosively from 1970 through 1972, before declining just as precipitously between 1972 and 1974 (see Figure 1). The growth in the dollar volume of trading on the PHLX between 1962 and 1968 was only sufficient to increase slightly its market share of exchange-traded equities. However, the explosive growth between 1969 and 1972 represented a 150 percent increase in its market share. The 1972–74 fall in trading volume was due partly to a decline in overall volume in exchange-listed equities and partly to a decline in the market share of the PHLX.

²⁴ In Figure 1, the data from 1950–53 combine the volume of the PHLX and the Washington, D.C. exchanges. As noted in the text, the two exchanges merged in 1953. At the time of the merger, volume on the PHLX was fifty times larger than that on the D.C. exchange.

²⁵ Table 1 in the appendix presents the overall dollar trading volume of exchange-listed securities and the market shares of the exchanges at five-year intervals. In this article, I report market share as a percentage of the dollar value of trading, not the number of shares or contracts traded.

Much of the growth in the PHLX's trading volume between 1964 and 1968 came from trades generated by mutual funds. As noted earlier, the NYSE and the regional exchanges imposed minimum public commissions with no volume discounts. Since the cost to a member firm of handling and executing a trade for a nonmember was well below the minimum commission, firms competed intensely to attract trading orders from the public, especially large-volume trades. Had there been no rules to prevent it, brokerage firms that belonged to the NYSE would undoubtedly have begun to offer cash rebates to block traders who directed orders to them. But NYSE rules prevented members from issuing cash rebates to nonmembers. Members could only share commissions with other members. In the early 1960s, most of the regional exchanges had rules similar to those of the NYSE, stipulating that a member of an exchange could only share trading commissions with other members.²⁶

At the same time, the Investment Company Act of 1940 placed a cap on the commissions that mutual funds could pay retail sales organizations. Since mutual funds often wished to exceed this cap in order to sweeten the incentive for retail brokerage firms to sell shares in their funds, they found several ways to evade the cap. If a firm selling shares in the mutual fund was a member of the NYSE, the fund could reward the firm by asking it to execute trades on the fund's behalf, paying the firm the fixed commission for this service. If the mutual fund preferred to use its traditional NYSE-member firm for executing trades, it could direct that firm to share its trading commission with another NYSE member firm that the fund wished to reward. This was known as a "give-up." But many small brokerage firms that sold shares in mutual funds to retail clients were not members of the NYSE. However, there was a way to reward them for these sales if they were members of a regional exchange. If the firm that traditionally executed trades for the mutual fund was also a member of a regional exchange, the fund could ask the firm to execute some trades on the regional exchange and share the commissions with another member of the regional exchange that the fund wished to reward. In the early 1960s, such arrangements accounted for a substantial share of the order flow on regional exchanges.²⁷ The regional exchanges could handle the associated large block trades because the trades were often prearranged off the floor of the exchange.

²⁶ As of 1963, the Pacific Coast, Detroit, and Cincinnati exchanges permitted some discounting of commissions for nonmember brokerage firms. SEC, *Special Study*, part 2, 936. As noted below, by the mid-1960s the PHLX and other regional exchanges joined these three exchanges in permitting a form of discounting through commission-sharing with nonmember brokerage firms.

²⁷ SEC, *Special Study*, part 2, 316–17.

In 1965, to attract even more business based on mutual fund-directed give-ups, the PHLX changed its rules to permit commissions to be shared with brokerage firms that were not members of the PHLX.²⁸ Since some small brokerage firms that sold shares in mutual funds were not members of any exchange, mutual funds could direct trading orders to the PHLX in order to reward them.²⁹

A second factor that increased the market share of the PHLX in the mid-1960s was an increase in taxes on security trades in New York City. The PHLX reported, "A one cent increase in the New York Stock Transfer Tax, from four to five cents during the year, advertised the fact that there had been no such tax for many years in any of the States where regional exchanges are located. This attracted block orders to all of them . . ."³⁰

The New York Stock Exchange was, of course, unhappy to see trades that would normally be executed on its floor diverted to regional exchanges. It lobbied the SEC to halt all cash give-ups. The SEC agreed with the NYSE that give-ups could undermine fixed trading commissions and weaken the cap on mutual-fund sales commissions. In December 1968, all commission splitting ended when the exchanges bowed to pressure from the SEC and agreed to ban the practice.³¹

The loss of institutional business associated with the end of give-ups could have been a major blow to the PHLX. It was not, however, because the PHLX instituted two new measures to attract institutional trades. In the 1960s, the NYSE did not allow institutions active in a wide range of activities to become members of the exchange. Membership was open only to entities whose *primary* purpose was serving the public as brokers or market makers. In addition, the NYSE did not permit foreign-owned securities firms to become members. This forced large foreign banks, many of which actively traded American securities on behalf of clients, to pay the public commission in order to trade on the NYSE. Prior to 1967, the PHLX had similar policies. But beginning in 1967, the PHLX allowed securities firms that were owned by mutual-fund companies, insurance companies, foreign-owned financial institutions or other institutions to become members.³² By early 1971, thirty-

²⁸ Philadelphia-Baltimore-Washington Stock Exchange, *Annual Report*, 1965.

²⁹ Other regional exchanges adopted similar give-up provisions. As *Business Week* reported, "[The regionals] raked in heavy trading from institutional investors because neither the Big Board nor the AMEX allowed give-ups of commissions to nonmembers. . . . Thus, whenever a mutual fund, for example, wanted to reward a small brokerage firm that sold its shares or provided research but which did not belong to any exchange, it could direct its broker to place an order through one of the six regionals that permitted give-ups to nonmembers." *Business Week*, 3 Jan. 1970, 74.

³⁰ Philadelphia-Baltimore-Washington Stock Exchange, *Annual Report*, 1966.

³¹ *Business Week*, 3 Jan. 1970, 74.

³² Joel Seligman, *The Transformation of Wall Street: A History of the Securities and Exchange Commission and Modern Corporate Finance* (Boston, 1982), 396.

nine such institutionally affiliated securities firms had joined the PHLX and had begun to trade on behalf of the institutions that owned them.³³ The institutional investors still had to pay the minimum public commission, but they paid it to firms owned by the institutions themselves. In this way, mutual funds and other institutions that traded high volumes of equities effectively received a discount from public commissions. Not surprisingly, this strategy was very successful for the PHLX. In 1968, 37 percent of its stock-trading volume came from institutional trades; by 1969, the amount had grown to 45 percent.³⁴

In 1968, the PHLX took a third measure to attract trading orders to the exchange. It doubled the number of seats, cutting the price of owning a seat in half. This made it feasible for even very small brokerage firms to join the PHLX. If a mutual fund wished to reward these new members for selling shares in the fund, it could pay them the standard public commission for handling some trades. *Business Week* reported admiringly of the exchange, then known as the Philadelphia-Baltimore-Washington (PBW) Exchange:

In 1968, its volume was up 25% to 48 million shares from the previous year. In 1969, volume rose another 23%. Two moves initiated by the exchange's president, Elkins Wetherill, helped to keep trading volume high: Doubling the number of seats and allowing institutions to become members. By cutting the cost of a seat in half (to \$16,500), small firms that sell mutual funds and which once were rewarded with give-ups could join and receive commissions directly. . . . The PBW is also picking up business by letting the institutions become members and save on commissions Liquidity is no problem because in the case of large blocks of stock both the sale and purchase (a so-called cross) are arranged beforehand and then executed on the floor of the exchange.³⁵

During the 1960s, not all regional exchanges were as successful as the PHLX. Several failed or were absorbed. One example was the Pittsburgh Exchange. By 1968, its share of the dollar value of all equity trades on exchanges had fallen to 0.03 percent.³⁶ This was too little volume to justify operating the exchange, and in 1969 the PHLX agreed to absorb it. Within two years, the PHLX closed the trading floor in Pittsburgh.

³³ Elkins Wetherill, Testimony in *Securities Industry Study*, Part 1, Hearing before the Subcommittee on Securities of the Committee on Banking, Housing, and Urban Affairs, U.S. Senate, 92nd Congress, 21 Sept. 1971, 217–18.

³⁴ Philadelphia Stock Exchange, *Annual Report*, 1969.

³⁵ *Business Week*, 3 Jan. 1970, 74.

³⁶ United States Securities and Exchange Commission, *35th Annual Report* (Washington, D.C., 1969), 193.

The market share of the PHLX grew strongly between 1968 and 1972. But over this same period, two serious threats appeared on the horizon. First, by the late 1960s there was much criticism of fixed trading commissions, and many influential groups were advocating deregulation. Since much of the business of the PHLX came from institutions that were trying to evade fixed trading commissions, freeing the commissions could threaten the viability of the exchange. Beginning in 1971, the exchange experienced a hint of this possibility. On April 5, 1971, the SEC approved negotiated commission rates on orders above \$500,000. This led institutions to redirect some of their large trades to the NYSE, as they could now negotiate discounted commissions. The SEC action explains much of the fall in the market share of the PHLX that began in 1972.

In a second threat to the PHLX, beginning in 1972 the SEC began to pressure the exchanges to exclude from membership brokerage firms that were owned by institutional investors. The PHLX lobbied hard against this policy.³⁷ But in 1975 Congress directed the SEC to adopt a ban on brokerage firms transacting business on behalf of affiliated institutional accounts. The ban was to become effective in 1978, but as it turned out this had little practical effect, since fixed trading commissions were liberalized in May 1975.

An Era of Innovation: 1975–1983

The liberalization of trading commissions could have sounded the death knell for the PHLX, but it did not, because the PHLX introduced an automated trading technology that met the needs of the emerging discount brokerage firms. It also began to trade equity options, which, as explained below, were largely immune to threats from other competing securities exchanges. And the PHLX created an options market for foreign currencies, benefiting for several years from its first-mover advantage.

Equity Trading. Beginning in May 1975, exchanges were no longer permitted to specify minimum commissions for nonmembers trading with them. This led to a rapid fall in commissions, especially the commissions paid per share traded by institutional investors. Institutions that had been directing many of their trades to regional exchanges began to return to the NYSE. After all, it was the market with the most competitive bidding on the floor and the only exchange capable of absorbing fairly large trades in widely held equities.

In 1978, there was a second major change in securities markets: the inauguration of the Intermarket Trading System (ITS). The ITS linked

³⁷ *Business Week*, 26 Feb. 1972, 22–23.

the floors of the exchanges, enabling traders on the floor of any exchange to see prices and transactions on all the others and to route orders to another exchange. Traders were expected either to match or to exceed the best bid or offer price shown on any other exchange, known as the national best bid or offer (NBBO), or to route their orders to an exchange quoting the NBBO.

Belying the terminology, a seller or buyer could conduct his or her transaction at the NBBO and still not receive the best price in the market. The NBBO is the best *quoted* price to buy or sell a stock up to a specified quantity limit. But dealers and brokers are often reluctant to quote the very best price they are willing to pay. This is because they hope to pay less than the maximum figure, and because the maximum that they are willing to pay depends on how well informed they believe their counterparty is. If a well-informed counterparty wants to sell at price \$X, the dealer can assume that the stock might well be worth less than \$X. Quoting conservative bid-and-offer prices reduces the chances that the dealer will be taken advantage of by well-informed traders. However, when a typical “uninformed” retail order comes to the floor of an exchange such as the NYSE, where several brokers and dealers commonly compete to get such orders, the rivalry often forces them to offer prices superior to the best quoted bid-or-offer prices. This “price improvement” means that investors frequently obtained a price somewhat better than the NBBO. Price improvements were comparatively rare on the floors of the regional exchanges, since the specialists generally did not face competition for orders from dealers or brokers on their floors. The specialists on the regional exchanges would, as required, match the NBBO or send the trade to another exchange, but they generally did not match any price improvement that cropped up on the NYSE.

The 1975 deregulation of brokerage commissions led to the rise of “discount” brokerage firms that charged low fees for providing basic retail trading services. Since they charged low commissions for handling the trades, in order to make a profit they had to execute these trades at a very low cost. Moreover, since the profit on each trade was small, they scrambled to handle a high volume of retail trades. Thus, the discount brokers preferred fast, reliable, automated executions of their trades to time-consuming or costly searches for the best price possible for their customers’ trades. Discount brokers argued that, in most cases, their customers gained more from low commissions than they would achieve from paying higher commissions to get the small price improvements often associated with less automated executions.

The PHLX responded to the changes that diminished its order flow from institutional traders by developing systems to meet the needs of retail discount brokers. It hoped that a high volume of small-value order

flow could sustain the exchange and its members by providing two sources of revenue. First, the exchange could gain revenue, since it was paid for reporting trade-execution data to the “consolidated tape,” a system that collected trading data from all the exchanges. Second, specialists on the exchange could profit from serving as consistent counterparties to the retail trades, since the specialists’ bid prices were always below their offer prices. But to attract the order flow from the emerging discount brokers, the PHLX had to offer automated, reliable executions at prices close to the best prices available anywhere. To do so, in 1975 the PHLX introduced a computerized system for handling and executing orders, called the Philadelphia Stock Exchange Automated Communication and Execution System, or PACE for short. PACE would route an entered retail order to the proper specialist. Orders that met predetermined criteria could be executed automatically by the specialist, who would guarantee that the price of the trade would match the NBBO.³⁸

Partly in response to the automation of retail order flow by several of the regional exchanges and third-market dealers, the NYSE also automated much of its retail order flow by introducing its Designated Order Turnaround System (DOT) in March 1976.³⁹ But PACE was more fully automated than DOT, a factor that the discount brokers valued. The DOT system, for example, had a built-in delay to permit brokers on the floor to better the price offered by the specialist or displayed in the specialist’s limit book. PACE did not have this feature. By late 1977, PACE accounted for about 12 percent of the PHLX’s share volume, and the PHLX reported that “a great percentage of the volume coming through PACE is new order flow for the Exchange—orders which would have been diverted to other markets in the past.”⁴⁰

³⁸ Competing on this basis became common for the regional exchanges and OTC dealers. As the SEC reported, “[Retail] orders are very rarely routed on the basis of quotations. Instead, order routing decisions are made on the basis of preexisting arrangements where service and costs are paramount and execution quality is eliminated as a factor because all markets guarantee execution at the BBO. Once the order is routed this way, it is rare that it will be sent to another market because the best quote will be matched instead of rerouting the order via ITS. Thus, market makers have little incentive to compete based on quotes. According to the Regional Exchanges, it is more effective to compete by marketing quicker and cheaper executions than by attempting to attract orders through displayed quotations.” United States Securities and Exchange Commission, *Market 2000* (Washington, D.C., 1994), A VI 40.

³⁹ The DOT system later evolved into SuperDOT. As with DOT, SuperDOT did not allow for fully automated executions since NYSE rules required the specialist to expose incoming orders to the crowd for possible price improvements. New York Stock Exchange Special Committee on Market Structure, Governance, and Ownership, *Market Structure Report*, 2000, 24.

⁴⁰ Philadelphia Stock Exchange, *Annual Report*, 1977. Well into the 1980s, news accounts credited PACE with attracting significant retail order flow. *Philadelphia Inquirer*, 18 Apr. 1986, C12.

Figure 2. PHLX dollar volume of equity trading. Source: annual reports of the PHLX.

Between 1974 and 1983 the PHLX experienced a significant increase in the dollar value of its equity trading volume (see Figure 2). But despite the PHLX's efforts to attract a high volume of retail trades, it lost market share relative to the combined share of the other exchanges. By 1983, its market share had declined to 1.5 percent from 2.3 percent in 1974. In other words, despite the efforts of the PHLX to attract the order flow of retail trades, the exchange lost market share as large institutional orders returned to the NYSE following the 1975 deregulation of fixed trading commissions.

Stock and Index Options. On June 27, 1975, the PHLX began to trade options on equities. It was the third exchange to do so. The Chicago Board Options Exchange (CBOE) had pioneered this path when it began to trade stock options in April 1973. Prior to that, options on equities had been traded only in an opaque over-the-counter market. Interest in trading options on the CBOE developed rapidly. In January 1975, the American Stock Exchange became the second exchange to trade equity options. It was followed shortly afterwards by the PHLX and the Pacific Stock Exchange.

When the PHLX introduced options trading, it started on a limited basis and expanded over time. Initially, for example, the PHLX traded only call options on five stocks.⁴¹ It slowly added other call options

⁴¹ The buyer of a call option has the right, but not the obligation, to purchase a stock from the seller of the option at a predetermined price by a specified date. The buyer of a put option has the right to sell a stock to the seller of the put option at a predetermined price by a specified date.

over the next few years. The PHLX began to trade put options in June 1977.

The main reason that the PHLX was slow to add new equity options was that the CBOE and the AMEX were already trading the most desirable equity options by the time the PHLX began to look for contracts to trade. Prior to 1977, although there was no rule preventing them from doing so, the exchanges rarely traded option contracts that were already traded on another exchange. People later charged that the options exchanges would not begin to trade an option contract traded on another exchange because of an implicit agreement to limit competition among the exchanges. In addition, the SEC and the exchanges expressed concerns about multiple trading of options contracts, since, unlike the equity exchanges, the options exchanges were not linked. This meant that there was no organized system to tell traders instantly on one exchange the quoted bid-and-offer prices and volumes on other exchanges. And there was no process to ensure that a trade on one exchange would not occur at a less favorable price than that available on another exchange.⁴² The SEC worried that public investors might be exploited in such fragmented markets and that the continuity and liquidity of the markets could be impaired.

Although the trading of the same option contract on more than one exchange was rare, it was becoming more common as the exchanges competed for order flow.⁴³ In 1977, the SEC acted on its concerns about market fragmentation by placing a moratorium on the trading of new equity options while it studied the options market and considered how to handle the multiple-trading issue.⁴⁴ Although the exchanges did not develop a linkage system during the moratorium, the SEC did not want to sustain the moratorium indefinitely, and it lifted it in March 1980. Still concerned about multiple trading on markets that were not linked, in June 1980 the SEC initiated a lottery for allocating the right to trade any new options on equities. Under this system, the exchanges would provide a list to the SEC of equity options that they wished to trade. The SEC would then use a lottery to allocate the exclusive right to trade these options to specific exchanges. This system remained in place until 1990. Over these ten years, the options exchanges never developed a

⁴² Traders on the floor of one exchange could follow prices and transactions on another exchange by obtaining data through third-party vendors, but this capability still would not provide the traders with an intermarket order routing system.

⁴³ *Investment Dealer's Digest*, 17 Aug. 1992, 14.

⁴⁴ The PHLX supported this move: "The imposed options moratorium, temporarily at least, answers our request for the halt to dual option trading. Earlier in the year, the PHLX attempted to call attention to a so-called dual trading war which was occurring between the options exchanges in their attempts to capture increased order flow." Philadelphia Stock Exchange, *Annual Report*, 1977.

Figure 3. PHLX dollar volume of equity option trades. Source: annual reports of the SEC.

system to link their markets, although they were persistently pressured by the SEC to do so.

Under the SEC lottery system, the flow of option trades to the exchanges depended on their ability to attract business for the options they were trading prior to the moratorium of 1977 and on their luck in obtaining the right to trade new desirable equity options through the lottery. By these measures the PHLX did well. The volume of equity options traded on the exchange grew consistently between 1975 and 1983 (see Figure 3). After 1978, the growth was particularly rapid. The market share that the PHLX had in equity options hovered around 3 percent between 1976 and 1978. During this period, the CBOE, with its first-mover advantage, had over 70 percent of the market. The AMEX's market share hovered around 20 percent.⁴⁵ But the rapid growth in equity option trades on the PHLX between 1978 and 1983 resulted in a tripling of its market share. By 1983, it had almost 9 percent of the overall volume of exchange-traded equity options. This created bustling activity on the options floor, for unlike the equity floor, it was active with brokers and specialists, and with market makers trading for their own accounts.⁴⁶ These were heady days among option traders

⁴⁵ Table 2 in the appendix provides data on the overall volume of equity options trading and the market shares of the exchanges.

⁴⁶ This was also true on the currency options floor during its best years. In both cases, the PHLX was a primary market in which national prices were set rather than, as in the case of the equity floor, a secondary market that based its prices on those determined by another exchange.

on the PHLX, and many boasted publicly of the easy money to be made.⁴⁷

At the end of 1983, there was a little-noticed development in options trading that would later benefit the PHLX. In December of that year, the exchange began to trade options on indices reflecting the price of the equities of firms in a particular economic sector.⁴⁸ Since these options settled only in cash, one could consider them to be purely a bet on the market-weighted average price of stocks in a particular economic sector. The PHLX began with two such sector indices, a precious-metals index and a gaming-and-hotel index. Initially there was little trading volume in such sector index options, but that would change over time.

Currency Options. Although the PHLX demonstrated foresight in moving relatively early to trade equity options, it could not claim to have pioneered this development. It simply copied the innovation launched by the CBOE. In the case of currency options, the PHLX was the innovator.

In the late 1970s, there was a huge spot market in foreign currencies and active over-the-counter forward and exchange-based futures markets. There was no organized market for foreign-currency options. Arnold Staloff, a staff member of the PHLX at the time, proposed that the PHLX should begin to trade options on foreign currencies. With the backing of PHLX management and some key members of the exchange, he started a long and complicated process to obtain approval from the SEC.⁴⁹ One major complication was that laws in the United States treated foreign currencies as commodities, and the commodity exchanges were regulated by the Commodities Futures Trading Commission (CFTC). The CFTC and the Chicago-based futures exchanges were determined to prevent SEC-regulated entities, such as the PHLX, from becoming centers for trading currency options. Since the SEC already regulated option trading in equities, it was equally determined to oversee options on other financial instruments, including foreign currencies. After much political and legal maneuvering, the SEC and the CFTC finally reached a compromise, known as the Shad-Johnson Accord, in late 1981. Under the terms of the compromise, the SEC was to oversee exchange-based trading in options on foreign currencies. Shortly afterward, the SEC permitted the PHLX to start trading foreign-currency options.

⁴⁷ Loren Feldman, "They're in the Money," *Philadelphia Magazine*, Dec. 1983, 189–218.

⁴⁸ *Securities Week*, 12 Dec. 1983, 11. The CBOE was the first options exchange to trade a stock-market index option. It initiated trading on a broad market index in March 1983. *New York Times*, 11 Apr. 1983, D9. The CBOE and AMEX began trading index options on narrower economic sectors in September 1983. *Securities Week*, 5 Sept. 1983, 9.

⁴⁹ For an entertaining account of the efforts by the PHLX to develop and market foreign currency options, see Gregory J. Millman, *The Vandals Crown: How Rebel Currency Traders Overthrew the World's Central Banks* (New York, 1995).

The PHLX opened its currency option trading floor on December 10, 1982. To help promote its new product, the PHLX initiated a series of seminars to explain to market professionals how it had structured its currency options market and to promote the use of exchange-traded currency options for hedging and speculation. In the first year of trading, the product appeared to be headed for success.⁵⁰ Trading volume started small and grew slowly but steadily. Orders came from small-scale speculators and from nonfinancial and financial businesses, many based in Europe, that used the exchange to hedge risks.

Some Boom Years and Some New Threats: 1984–2000

The period from 1984 through 2000 included some of the most successful years for the PHLX in modern times. Volume was heavy on almost all stock markets, including the PHLX. In addition, the two new products from the previous period—equity and currency options—brought a very high volume of order flow and associated high incomes to many PHLX members for extended periods.

At the same time, many members and managers of the exchange worried that the success was likely to be short lived. There were no barriers to entry, other than the PHLX's first-mover advantage, that would protect its dominance of currency options. And the SEC repeatedly indicated that it was dissatisfied with the monopolies held by the options exchanges in the majority of equity options. The SEC pushed hard for the options exchanges to create a linkage system and move to multiple listings. Few PHLX members held high hopes for the future of pure equity trading. The PHLX continued to lose market share in this arena, and its members felt a need for ever higher trading volumes as average profits per trade were squeezed by the need to pay for order flow and by narrowing spreads between bid and offer prices.

These concerns, as well as the recognition that the PHLX would have to spend large sums to keep its software, hardware, and self-regulatory functions abreast of other exchanges, led to explorations of several merger possibilities with other exchanges between 1989 and 1993. None of these came to fruition, but several years later, in 1998, the PHLX came very close to merging with the AMEX.⁵¹ The merger was called off

⁵⁰ *Financial Times*, 6 Oct. 1983, I16.

⁵¹ In June 1998 the PHLX Board tentatively agreed to a merger proposal from the AMEX. It was reported that PHLX lagged in technology and thought it had to invest many millions of dollars to catch up. *Investment Dealers Digest*, 15 June 1998, 5–6. The AMEX, on the other hand, had state-of-the-art technology that allowed for electronic processing of orders, cancellations, and replacement orders. The desire of the PHLX to gain AMEX's technology and the desire of the AMEX to gain PHLX's options business apparently motivated the merger. Under the terms of the merger, PHLX's options business would have moved to New York City. The merger plans were aborted in April 1999.

at the last minute, because major changes in the options industry raised serious doubts about whether it would be advantageous to both parties.⁵²

The period from 1984 to 2000 was not one that purely relied on the innovations from the previous era. During these fifteen years, the PHLX made one further significant innovation. In March 1988, after a two-year costly development effort, the PHLX asked the SEC to approve its application to trade "cash index participations," or "CIPs" for short. The CIP was to trade like a stock but, like a futures index, its price would depend on the value of an index of stocks. Unlike a futures index, the CIP would pay a quarterly dividend based on the dividends of the stocks in the index, and it would have no expiration date. Shortly after the PHLX filed its application with the SEC, the AMEX and the CBOE applied to trade very similar products.⁵³ The PHLX asked the SEC to permit it to trade CIPs for several months before giving the green light to the trading of similar products at the other exchanges, but the SEC gave its approval for the simultaneous launching of the products at all three exchanges. Soon after the CIP began to trade on the options floor of the PHLX, the CFTC brought a lawsuit, arguing that CIP-type products were futures contracts and should be regulated by the CFTC and traded on futures exchanges. In August 1989, a federal court ruled in favor of the CFTC and ordered the PHLX and the other exchanges to stop trading CIPs.⁵⁴ They all did so, but the AMEX worked to redesign its CIP-type product in order to avoid its designation as a product that should be traded on a futures exchange.⁵⁵ In 1993, the AMEX introduced an "exchange traded fund," the replacement for the CIP. In subsequent years this became a highly successful product for the AMEX.

In addition to creating the CIP, the PHLX opened a futures exchange, named the Philadelphia Board of Trade (PBOT), in May 1985.⁵⁶ The first securities traded on the PBOT were cash-settled options on Eurodollars futures and a futures contract on an over-the-counter

⁵² *Philadelphia Inquirer*, 23 Apr. 1999, D1.

⁵³ A former official of the PHLX informed me during an interview that the PHLX and the other exchanges commonly faxed to each other copies of proposed routine rule changes so they could maintain a unified set of rules. According to this individual, an administrative assistant at the PHLX mistakenly faxed copies of PHLX's plans for the CIP to the other exchanges, enabling the other exchanges to immediately present the SEC with copycat proposals.

⁵⁴ *Philadelphia Inquirer*, 19 June 1990, E1. Nicholas Giordano, the president of the PHLX at the time, was obviously frustrated with the CFTC. One trade journal quoted him as saying, "The CFTC should stick to what it is good at . . . like regulating pork bellies." *Banker*, 1 Jan. 1990, 3.

⁵⁵ The PHLX had a futures exchange and could have reintroduced the CIP as a futures product, but it did not do so. In its view, the CIP could not succeed as a futures product, since far fewer brokers were qualified to trade futures contracts than spot contracts.

⁵⁶ *New York Times*, 13 May 1985, D5.

Figure 4. PHLX dollar volume equity shares traded. Source: annual reports of the PHLX.

stock-market index. Due to a lack of interest, the exchange stopped trading both products in 1986. In the same year, however, it introduced trading in futures contracts on a variety of foreign currencies. It hoped that traders on its currency options floor might direct trades to the PBOT to hedge their risk exposures. The PBOT had up-and-down years closely tied to the general activity in currency markets, but as a late entrant it never gained more than a tiny share of the foreign-currency futures market. In 1999, the PHLX closed the PBOT. Nevertheless, during the years in which the PHLX hosted an equity-trading floor, an equity options floor, a currency options floor, and a futures market, it was the most diversified exchange in the country.

Equity Markets. With the exception of just a few down years, equity trading volume on the PHLX grew strongly from 1984 through 2000 (see Figure 4). This reflected the general boom in equity markets over this period, and, in fact, the market share of the PHLX fell despite the growth in the volume of trading. The growing order flow fed the profits of specialists on the PHLX and other exchanges. But there were offsetting developments that cut into the profits of specialists on the exchange and made it even more essential for specialists to attract a high volume of order flow.

Specialists and OTC dealers competed to attract retail order flow, since they could profit from the spread between the bid and ask price. Not surprisingly, in competing for this order flow, specialists on the regional exchanges and OTC dealers began to offer financial incentives to

brokerage firms that were willing to direct orders to them. This became known as “payment for order flow.” Although it is not clear who initiated the practice and when, by the mid-1980s there were reports that the practice was common among OTC dealers.⁵⁷ Discount brokers, who were competing with each other to charge the lowest trading commission, were particularly likely to seek payments for order flow. These payments enabled them to cover their operating costs by means other than commissions.

There is no record of when specialists on the PHLX began to pay for order flow, but the practice likely started in the mid-1980s.⁵⁸ Although it helped the specialists attract the order flow, it reduced their profits on each trade. Thus, the specialists’ profits associated with the rapid increase in trading volume were less than they would have been had the specialists not had to pay for much of the order flow.

The managers of the PHLX were acutely aware that the exchange needed to attract high volumes of orders to support the specialists on the equity floor. In the mid-1980s, they appealed to large financial institutions located in the Philadelphia metropolitan area to direct some of their stock-trading business to the PHLX.⁵⁹ But this appeal apparently had little effect.⁶⁰ In February 1993, the PHLX began to trade selected stocks that were listed on the NASDAQ.⁶¹ The SEC had approved this possibility on a limited basis in 1986, and on a more extensive basis in 1990. The Chicago Stock Exchange began to trade a subset of NASDAQ-listed stocks in May 1987 and attracted sufficient volume to maintain the effort. The PHLX thought that it too might attract order flow for several of the NASDAQ-listed stocks in which it had active options markets, but the effort was unsuccessful, and the PHLX halted trading in the NASDAQ stocks in early 1996.⁶²

In the late 1990s, spreads between bid and offer prices narrowed, which further reduced specialists’ profits for a given volume of orders.

⁵⁷ Jane Sasseen, “Dirty Little Secret,” *Forbes*, 17 June 1985, 203.

⁵⁸ The SEC announced in early 1986 that it would informally study the use of payment for order flow among dealers for listed securities on the exchanges. *Securities Week*, 17 Feb. 1986, 4.

⁵⁹ *Philadelphia Inquirer*, 18 Apr. 1986, C12.

⁶⁰ In interviews, two former presidents of the PHLX told me that Boston-area financial institutions have long supported the Boston Stock Exchange by ensuring that it receives some of their stock-trading orders. They lamented that, at least in the 1980s, Philadelphia-area financial institutions were not equally supportive of the PHLX. This reminded me of the claim by the sociologist E. Digby Baltzell that the wealthy families of Boston have always been much more civic spirited than upper-class Philadelphians. E. Digby Baltzell, *Puritan Boston and Quaker Philadelphia: Two Protestant Ethics and the Spirit of Class Authority and Leadership* (Free Press, 1979). As indicated by the title of his book, Baltzell attributed this difference to the religious heritages of the two cities.

⁶¹ Philadelphia Stock Exchange, *Annual Report*, 1992.

⁶² *Securities Week*, 7 Jan. 2002, 4.

One force behind the narrowing of spreads was the SEC-mandated conversion from pricing in fractions of a dollar to pricing in decimals. Whereas prior to 1999 the narrowest possible spread was one-sixteenth, or \$0.0625, by 2001, it was one penny. The switch to pricing in finer increments achieved exactly what its advocates intended: it significantly narrowed average spreads.⁶³ A second force behind the narrowing of spreads was SEC pressure. In response to its concerns about payments for order flow, the SEC indicated that it would look unfavorably on brokers who routinely sent orders to markets offering NBBO without price improvements. This put pressure on the regional exchange specialists to trade at prices that were superior to the NBBO, enabling brokers who routed their trades to these exchanges to argue that their customers were receiving competitive prices. But such price improvement narrowed the spread received by specialists. In June 1998, the PHLX modified PACE so that it would automatically offer a price that was superior by one-sixteenth to the NBBO for many trades.⁶⁴ Subsequently, the PHLX continued to refine this automatic price-improvement feature.

Under increasing pressure to generate higher volumes of trading orders for its equity floor, in mid-2000 the PHLX announced that it had formed a partnership with an electronic communication network (ECN). ECNs are computerized order-matching services that started in the late 1990s. By 2000, they had gained a significant share of trades in OTC stocks, but only a minor share of trades in exchange-listed stocks, a situation they were trying to remedy.⁶⁵ But to display widely and promptly their quotes for exchange-listed securities, ECNs needed to gain access to the consolidated quote system (CQS) that the exchanges use. ECNs could show their quotes on NASDAQ's Computer Assisted Execution System (CAES), which interfaced with the Intermarket Trading System (ITS) that enabled trades to be routed to the floor of any of the equity exchanges. But many ECNs wanted no part of the ITS because they considered it to be unreliable and slow.⁶⁶ For one thing, when Exchange A sent Exchange B a commitment to trade, Exchange B had up to two minutes to respond. For most automated trading operations, this was far too long to wait.

The PHLX envisioned mutually beneficial opportunities as ECNs

⁶³ One recent study estimated that spreads narrowed by about 28 percent for NYSE-listed securities. See a report issued by Lehman Brothers written by Maureen Murphy and Luba Krayterman, "Trading Places: The Future of U.S. Equity Market Structure," 11 Feb. 2002, 18.

⁶⁴ *PR Newswire*, 1 June 1998.

⁶⁵ By 2001, ECNs handled about 5 percent of the volume in exchange-listed stocks. Murphy and Krayterman, "Trading Places."

⁶⁶ James McAndrews and Chris Stefanadis, "The Emergence of Electronic Communications Networks in the U.S. Equity Markets," Federal Reserve Bank of New York, *Current Issues in Economics and Finance* 6, no. 12 (2000).

Figure 5. PHLX dollar volume equity option trades. Source: annual reports of the SEC.

sought to increase their volume of trading in exchange-listed stocks. In June 2000, it announced an agreement with the Bloomberg Tradebook, an ECN that mainly served institutional investors.⁶⁷ Under the agreement, Bloomberg could go through the PHLX to post its quotes on listed securities on the CQS. The PHLX, in turn, hoped to gain equity order flow from the Bloomberg agreement and get transaction and market-data fees from any trades that Bloomberg generated. The PHLX announced that it would like to strike similar deals with other ECNs.⁶⁸ While such efforts to increase order flow on the equity floor of the PHLX might pay off over time, by 2000 the market share of the exchange had fallen to an all-time low (0.6 percent), making it the smallest exchange for equities.

Equity and Index Options. The volume of trading in equity options on the PHLX was relatively stable from 1983 to 1989, despite the 1985 entry of the NYSE into the equity options market (see Figure 5). The NYSE was simply too late. It could not use its dominance of exchange-based equity trading to gain more than a tiny toehold in the options market. When the NYSE entered the market, other exchanges were already trading the most desirable options, and dual trading of options

⁶⁷ *Securities Week*, 12 June 2000, 1.

⁶⁸ Other regional exchanges, most notably the Cincinnati Stock Exchange, also used business relationships with ECNs to bring trading orders to their floors. In 2002, the ECN Archipelago took over the equity trading floor of the Pacific Stock Exchange, effectively gaining all the privileges of an exchange. *Financial Times*, 3 Apr. 2002, 4.

on exchange-traded stocks was not permitted. Prior to 1990, the only way that the NYSE could trade an option on an exchange-listed stock was to participate in the SEC's lottery. Even after 1993, when the SEC began to allow multiple trading for all stock options, the NYSE, like the other exchanges, chose not to trade options that had been allocated to other exchanges through the lottery. After more than a decade of fighting to build its options business under such restrictions, in 1997 the NYSE gave up, shutting down its options trading floor.

The PHLX, along with other options exchanges, experienced a slump in the volume of options trading between 1990 and 1992. This is commonly attributed to the end of the corporate takeover era associated with the failure during the 1990s of Drexel Burnham and the creation of more effective corporate takeover defenses.⁶⁹ In the late 1980s, a substantial share of the business in options came from individuals and institutions speculating on possible takeover targets.

The volume of options trading on the exchanges picked up in 1992, but the PHLX participated in very little of this growth. The PHLX lost significant market share in equity option trades between 1989 and 1995. Much of this decline was simply due to bad luck, as the PHLX did not happen to trade some of the equity options that experienced the highest volume of trading in this period.

The luck of the PHLX turned around in the mid-1990s. Beginning in 1996, there was a general boom in equity option trading, much of which represented speculation or hedging in the stocks of high-flying technology companies. Since many of these firms were relatively young, the CBOE and the AMEX were not generally trading options on their stocks before the PHLX entered options trading. Thus, the PHLX share of the option contracts on the stocks of these firms was almost equivalent to that of any other exchange. When the boom began, the PHLX was well positioned to participate. Between 1996 and 1998, the PHLX saw rapid growth in trading on its equity options floor (see Figure 5). In fact, the explosive volume led to serious problems for the PHLX, since its trade routing, executing, and reporting technologies were antiquated and could not keep up with the order flow in its most active options.⁷⁰ This situation hurt the reputation of the exchange and cost it potential business. Nevertheless, as reflected in the price of seats to trade equity options, these were boom times. The highest price paid for a seat to trade equity options on the PHLX in 1993 was \$20,000. By 1998, it was \$305,000.⁷¹

⁶⁹ *Philadelphia Inquirer*, 26 Sept. 1990, E10.

⁷⁰ *Wall Street Journal*, 27 Apr. 1999, B30

⁷¹ Data provided to the author by the PHLX.

The PHLX introduced trading in sector-index options in 1983. Shortly afterward, the PHLX also began to trade options on broad equity-market indices. At first there was only modest interest in the PHLX's index options. But order flow for index options grew very rapidly between 1992 and 1999. Trading in the PHLX's sector-index options was particularly strong. As the PHLX reported, "Three of the Exchange's [sector index options] . . . are by a significant margin the most actively traded instruments of their type in the securities industry."⁷²

Although equity options were a major success for the PHLX from 1984 through 1999, the exchange could never be sure that this success would last. During the 1980s, the PHLX and the other options exchanges had a legal monopoly in the trading of many of their most active options. The SEC had created this situation because of its concern that multiple trading of identical option contracts among unlinked markets would be detrimental to public investors.

The SEC pressed the options exchanges to create a linkage system during the period when it allocated exclusive trading rights via a lottery. But the options exchanges failed to create such a system, even after a decade of discussions.⁷³ Frustrated, the SEC decided to end the monopolies that the exchanges enjoyed in option contracts while continuing to push the exchanges to create a linkage system. The SEC took an incremental approach. In 1985, it announced that the right to trade options on OTC stocks would not be allocated through a lottery. These options could be traded on multiple exchanges. In January 1990, the SEC ended its lottery system for allocating options on exchange-listed stocks. The SEC ruled that henceforth any new options that an exchange began to trade could also be traded on another exchange. These changes in policy had only a modest effect. In August 1992, only 111 of 1,000 equity options traded on more than one exchange.⁷⁴ At the close of 1992, the PHLX traded 228 equity options. Only 31 of these were traded on other exchanges.⁷⁵ In November 1992, the SEC began to lift exclusive trading privileges for the approximately 500 equity options allocated through the lottery system prior to 1990. It did so in stages, starting with the least actively traded options. By the mid-1990s, all restrictions on multiple trading had been lifted, but the exchanges still chose not to trade options that had been allocated to other exchanges under the lottery system. In mid-1999, about 60 percent of equity options still traded on only one exchange, and these included almost all of

⁷² Philadelphia Stock Exchange, *Annual Report*, 1994.

⁷³ *Wall Street Journal*, 6 Oct. 1999, C20.

⁷⁴ *Investment Dealers Digest*, 17 Aug. 1992, 14.

⁷⁵ Philadelphia Stock Exchange, *Annual Report*, 1992.

the most active options.⁷⁶ The PHLX, for example, was the only exchange to trade options in Dell Computers prior to late 1999. This was an extremely active option, as alone it accounted for 30 to 50 percent of the volume in equity options on the PHLX during much of 1999.

Despite the strong volume of order flow to the PHLX options floor in early 1999, many people were highly pessimistic about the continuing health of this business. And, in fact, a number of their worries soon materialized. Several large securities firms, for example, announced in 1998 that they were investing in the creation of an all-electronic options exchange, to be known as the International Securities Exchange (ISE). The backers of the ISE also announced that this exchange would trade option contracts traded on other exchanges. In other words, it planned to break the monopolies that the exchanges had enjoyed with many active options contracts.

A second threat was the escalating pressure that the SEC and the U.S. Justice Department were applying to induce the options exchanges to trade the other exchanges' active options. By the late 1990s, the reluctance of the options exchanges to compete for other exchanges' option contracts led the SEC and the Justice Department to charge that there was a "gentlemen's agreement" among the exchanges not to compete. Both agencies filed suit. The exchanges denied the charge, but in 2000 they agreed to spend millions to improve self-regulation as part of a settlement with the Justice Department and the SEC. The PHLX, in particular, committed to spend \$8 million. The PHLX also paid \$2.8 million in 2000 to settle a class-action lawsuit, in which it had been accused of increasing option spreads by squelching competition.

By late 1999, litigation threats from the SEC and the Justice Department and the threat by the ISE to trade other exchanges' most active option contracts finally achieved the result that the SEC desired. In August 1999 the CBOE and AMEX broke the alleged gentlemen's agreement when they began to trade options in Dell Computers. They immediately attracted a significant share of the Dell order flow away from the PHLX. Not surprisingly, the PHLX retaliated by initiating trading in several of the most actively traded option contracts on the CBOE and AMEX.⁷⁷

Option traders on the floor of the PHLX did have some good news in 1999. As noted earlier, in the mid-1990s the computerized trading

⁷⁶ *Financial Times*, 19 Aug. 1999, 28.

⁷⁷ *New York Times*, 24 Aug. 1999, C3. Multiple listing occurred despite the lack of an intermarket linkage system. In October 1999, SEC chairman Arthur Levitt reprimanded the options exchanges for failing to comply with his request (made in February) that they link their markets. He gave them ninety days to come up with a plan for doing so, and they did. The plan was phased in between 2001 and 2003.

systems of the PHLX, especially for options, were antiquated and could not handle especially high volumes of trading activity. Gaining access to better trading technology had been much of the impetus for the merger discussions of the late 1990s. While those discussions were underway, the PHLX began a costly but intentionally low-profile internal effort to improve its systems. In early 1999, almost at the same time as it announced that merger plans with the AMEX were no longer under consideration, it unveiled new computerized trading systems.⁷⁸ The systems were widely recognized to be state-of-the-art. The trading technology of the PHLX ceased to be an issue.

Over the course of 2000, the four major options exchanges (CBOE, AMEX, PHLX, and Pacific Stock Exchange [PSE]) increasingly added trading in the option contracts that were most active on other exchanges. This competition became even more heated when the new, all-electronic ISE options exchange opened for business in May 2000 and lived up to its promise to immediately begin trading the option contracts active on other exchanges.

Many people had argued that multiple trading of options contracts might be particularly damaging to the PHLX, since it had a relatively small market share and depended heavily on a small number of active options contracts. These worries had partly motivated earlier efforts by the PHLX to merge with another exchange. Contrary to these concerns, the move to multiple trading benefited the PHLX within the near term, partly because of the way the PHLX managed it. When the CBOE and the AMEX began to trade the Dell options that were the backbone of the PHLX in the late 1990s, the PHLX immediately retaliated by permitting several of its specialists to begin trading some of the options that were most active on the other exchanges. After that, however, it proceeded at a more deliberate pace. The exchange would announce plans to trade an option contract that was active on another exchange. But rather than allocating the specialist position to one of the firms already active on the PHLX, it would offer it to a large specialist operation that had not previously traded on the PHLX. In this way, the PHLX used the opportunity to trade desirable new options contracts to entice the largest and best capitalized specialist firms to become active on the PHLX.⁷⁹ Since such firms could attract orders based on their reputations and capital, this tactic augmented the volume of trading on the options floor.

⁷⁸ *Wall Street Journal*, 27 Apr. 1999, B30.

⁷⁹ The PHLX also encouraged specialist firms that were not able to attract significant order flow to transfer their specialist positions to other firms that might be able to attract more business. It did this by levying a fee on all specialist firms. The fee was based on the assumption that the firms have 10 percent of the aggregate exchange-traded order flow in their option contracts.

As the exchanges competed for each other's order flows, it is perhaps not surprising that the specialists on the various exchanges began to pay for order flow.⁸⁰ In July 2000, the CBOE escalated this competition by instituting a system that effectively taxed all specialists and market makers to raise funds for order-flow payments. The PHLX announced that it opposed this exchange-sponsored system of payment for order flow. But it also made clear that it would not sit on the sidelines while others took its business. In August 2000, the PHLX instituted a system similar to that of the CBOE, but attached even higher fees to its specialists and market makers and required higher order-flow payments. This policy, along with the increasing presence of large specialist firms trading on the PHLX, helped feed a boom in PHLX order flow in late 2000 and early 2001.⁸¹

Although the PHLX handled a record volume of equity option trades in 2000, it had reason to be concerned about the future. Competition among specialists trading the same option contracts on different exchanges, as well as the shift to decimal pricing for equities, had narrowed spreads between bid and offer prices.⁸² This, along with payments for order flow, made it more important than ever to sustain a high volume of trading to support market-makers on the exchange. In addition, the PHLX faced a new competitor in the all-electronic ISE. Times were good on the option floor in 2000, but there was little room for complacency.

Currency Options. As the PHLX worked to promote its fledgling currency options market in 1983, large commercial and investment banks increasingly began to write tailor-made currency option contracts for their corporate customers who were looking for better ways to hedge exchange-rate risks.⁸³ The banks hedged their own net risk exposures by taking appropriate positions in the spot market or the futures market, by trading currency options with each other in a developing OTC market, and by trading options on the PHLX.⁸⁴ When the banks traded on the PHLX, their orders were generally far larger than the specialists and market makers could handle. The banks would therefore use a broker to find another institution, generally another bank, willing to take the other side of the trade. Once two parties agreed to the terms

⁸⁰ Laura Johnson, "'Payment for Order Flow' Seeps into Options Markets," *Wall Street Letter*, 25 Oct. 1999, 1–2.

⁸¹ *Philadelphia Inquirer*, 21 Jan. 2001, E1.

⁸² SEC chairman Levitt reported, "In four of the five actively traded options we examined, effective spreads have fallen between 22 and 44 percent since these options went from single exchange trading to multiple listings." Arthur Levitt, "The Future of Our Markets: Dynamic Markets, Timeless Principles," *Columbia Business Law Review* (Winter 2000): 8.

⁸³ *American Banker*, 24 Jan. 1984, 1.

⁸⁴ *Ibid.*, 17 Jan. 1985, 16.

Figure 6. PHLX volume of currency option contracts traded. Source: annual reports of the PHLX.

of the trade, they would execute it on the floor of the exchange. Market makers on the floor would not interfere with these block trades. This practice enabled the exchange to handle large trades smoothly, and it contributed to the rapid growth in trading volume between 1983 and 1987 (see Figure 6).

By mid-1984, it was clear that the PHLX had become the dominant trading center for what could become a very large market. Financial officers at large, internationally active firms who never knew that Philadelphia had a stock exchange were now acutely aware of its presence.⁸⁵ The success that the PHLX was having with currency options was not lost on other exchanges, several of which also began to trade them. The Chicago Board Options Exchange began to trade currency options in September 1985, two years after the PHLX initiated the market. But it could never overcome Philadelphia's first-mover advantage, and few traders could see any reason to divert order flow from the PHLX.⁸⁶ In August 1987, the CBOE withdrew from the business.⁸⁷

Much of the order flow for currency options came from institutions

⁸⁵ *Financial Times of London*, 2 Oct. 1984, I13.

⁸⁶ *Journal of Commerce*, 3 Aug. 1987, 7B.

⁸⁷ When the CBOE stopped trading currency options, its president remarked, "History keeps proving that the first one there (in the market) is the most likely to succeed." *Chicago Tribune*, 3 Aug. 1987, B7.

in Europe, especially London.⁸⁸ Not surprisingly, the European exchanges resented the domination of the business by an American exchange. In mid-1985, the London Stock Exchange and the London International Financial Futures and Options Exchange (LIFFE) started to trade currency options.⁸⁹ Similarly, the French futures exchange, the *Marché à Terme International de France* (MATIF), started trading currency options in early 1994.⁹⁰ But none of these competitors were able to displace the dominance of the PHLX in exchange-traded currency options.

After several years of rapid growth, the volume of trades on the PHLX leveled off between 1987 and 1990 (see Figure 6). This was primarily due to the growth of the OTC market and the creation of exchange-rate bands for the European currencies that belonged to the European Monetary System. The reduced volatility of these currencies relative to each other reduced the demand to hedge currency risks and limited opportunities for speculation. Nevertheless, this was a halcyon era for many currency options traders on the PHLX, who reaped substantial profits from market-making and speculating on the floor of the exchange that dominated currency options. Growth in trading volume resumed with the turmoil among European exchange rates in the early 1990s.⁹¹

After the peak in 1993, the volume of trading in currency options on the PHLX started a precipitous decline. By 2000, trading volume was so low as to be an insignificant part of the business of the exchange. This decline was mainly caused by the continued growth of the OTC market. Many corporations preferred to hedge in the OTC market, since banks would tailor contracts to their specific needs.⁹² In addition, the major international banks that had provided much of the order flow to the PHLX began to deal exclusively in the OTC market. By the early 1990s, this market was well developed, and it had numerous very well-capitalized market makers. As the market developed in the mid-1980s, the option contracts that banks traded among each other to hedge their net exposures became somewhat standardized, adding to their liquidity.⁹³ A study issued by the International Monetary Fund reported as follows:

The development of an extensive and sophisticated OTC market structure in the 1980s and 1990s with many of the world's largest financial institutions serving as market makers has greatly enhanced

⁸⁸ Nicholas Giordano, then the president of the PHLX, stated, "60% of our volume in foreign exchange options comes from overseas hedgers and traders." *New York Times*, 13 May 1985, D5.

⁸⁹ *Financial Times*, 5 Aug. 1985, I5.

⁹⁰ *Ibid.*, 28 July 1994, 25.

⁹¹ *Philadelphia Inquirer*, 18 Sept. 1992, A16.

⁹² *Investment Dealers Digest*, 7 Sept. 1992, 5. In 1994, the PHLX introduced customized currency options contracts in an effort to compete with the OTC, but these never gained much market share from the banks.

⁹³ *Financial Times*, 11 Dec. 1985, III6.

the liquidity of OTC derivatives markets. This, in turn, has lowered the cost of participation and supported the expansion of the market. Measured by notional principal, OTC derivative markets have grown to roughly nine times the size of those for exchange-traded derivatives. . . .⁹⁴

One close observer of the PHLX market added another reason for the shift in business to the OTC market by banks and other large institutions.⁹⁵ He explained that as the currency options floor of the exchange grew, market makers on the floor began to behave more aggressively, insisting on participating in large trades that had been negotiated off the floor of the exchange. This fragmented the large orders and frustrated the institutions that were trading them through the PHLX. Many responded by shifting all their trades to the OTC market.⁹⁶

Conclusion

This account of the evolution of the Philadelphia Stock Exchange from the 1950s through 2000 takes an important step toward correcting the general neglect of the role of the regional exchanges in securities markets. In addition, it makes two points. First, as is widely recognized, there is a tendency for trading to flow to the market with the greatest liquidity. While the history of the PHLX provides substantial support for this proposition, it also illustrates that other factors have shaped order flow to securities markets. These include government regulations, differentiated trading technologies across markets, limitations on access to leading exchanges, and, possibly, collusive behavior. Second, the evolution of the PHLX illustrates how one small securities exchange could adapt to survive in an industry subject to profound regulatory and competitive shocks. In each decade examined in this study, the PHLX's main business was very different from what it had been in the preceding decade. In the 1950s, the PHLX was a small equities exchange whose order flow came mainly from regional brokerage firms that were not members of the NYSE. By the 1990s, the PHLX was trading equity and currency options, and its equity floor was highly automated, mainly serving discount brokerage firms throughout the country.

⁹⁴ Garry J. Schinasi et al., *Modern Banking and OTC Derivates Markets: The Transformation of Global Finance and its Implications for Systemic Risk*, Occasional Paper #203. (Washington, D.C., 2000), 64.

⁹⁵ Author's interview with Arnold Staloff, 17 Sept. 2002.

⁹⁶ In late 1993, the PHLX tried to prevent the fragmentation of large currency option trades by stating that orders of more than one thousand contracts could be required to execute at a single price. *Securities Week*, 15 Nov. 1993, 5. Unfortunately for the PHLX, by this time most block traders had already shifted to the OTC market or were planning to do so, and thus were not willing to return to the PHLX.

Appendix

Table 1
Market Shares of Dollar Volume of Equity Trades by Exchange

<i>Year</i>	<i>Total \$ Volume (in millions)</i>	<i>NYSE</i>	<i>AMEX</i>	<i>CHX</i>	<i>PSE^a</i>	<i>PHLX^a</i>	<i>BSE</i>	<i>CSE</i>
1950	21,808	85.91	6.85	2.35	2.19	1.03	1.12	0.11
1955	38,039	86.31	6.98	2.44	1.90	1.03	0.78	0.09
1960	45,310	83.80	9.35	2.72	1.94	1.03	0.60	0.07
1965	89,549	81.78	9.91	3.44	2.43	1.12	0.42	0.08
1970	131,708	78.44	11.11	3.76	3.81	1.99	0.67	0.30
1975	157,257	85.20	3.67	4.64	3.26	1.73	1.19	0.17
1980	476,501	83.53	7.33	4.33	2.27	1.61	0.52	0.40
1985	1,200,128	85.25	2.23	6.59	3.06	1.49	1.20	0.18
1990	1,616,798	86.15	2.33	4.58	2.77	1.79	1.63	0.74
1995	3,507,991	87.71	2.10	3.26	2.24	1.27	1.43	1.99
2000	13,691,342	81.93	5.53	7.58	1.19	0.62	1.87	1.26

^a The market shares of the Philadelphia Stock Exchange and the Pacific Stock Exchange include the shares of the exchanges that were incorporated into them through mergers. Source: SEC annual reports.

Abbreviations: NYSE, New York Stock Exchange; AMEX, American Stock Exchange; CHX, Chicago Stock Exchange; PSE, Pacific Stock Exchange; PHLX, Philadelphia Stock Exchange; BSE, Boston Stock Exchange; CSE: Cincinnati Stock Exchange; CBOE, Chicago Board Options Exchange.

Table 2
Market Share of Equity Option Sales by Exchange^a

Year	Total \$ Volume of Equity Options Traded (in millions)	AMEX (%)	NYSE (%)	PSE (%)	PHLX (%)	CBOE (%)
1976	11,734	19	0	1	3	77
1977	10,899	17	0	4	3	69
1978	18,953	19	0	4	3	72
1979	23,158	26	0	4	5	60
1980	45,873	27	0	4	6	61
1981	41,423	33	0	5	9	54
1982	53,660	27	0	5	8	60
1983	59,599	25	0	6	9	60
1984	33,822	26	0	8	10	55
1985	29,544	28	0	10	8	53
1986	40,054	32	1	9	9	49
1987	53,123	31	1	11	9	49
1988	27,164	33	2	10	11	44
1989	40,423	27	2	11	12	48
1990	27,219	30	2	12	10	46
1991	27,104	34	1	13	9	42
1992	26,586	35	2	12	9	42
1993	33,779	34	1	12	8	45
1994	35,883	29	1	14	8	47
1995	50,803	29	1	19	7	44
1996	67,862	33	1	15	7	44
1997	104,535	33	0	17	9	40
1998	140,261	32	0	16	11	41
1999	260,294	28	0	16	8	48
2000	481,440	28	0	17	15	40

^a Includes stocks, rights, and warrants.

Source: SEC annual reports.