Steven Globerman

E-BUSINESS AND GLOBAL SOURCING – INFERENCES FROM SECURITIES EXCHANGES

Abstract

This paper sets out a conceptual model that describes how the configuration of relevant geographic markets might change as electronic "gateways" or portals challenge conventional markets. It then considers the main conceptual inferences against the experience of securities markets. Consideration of empirical evidence suggests that e-business will lead to expanded geographic markets, although the pace and extent of the expansion might be slower and less dramatic, even in the long-run, than early enthusiasts of e-business may have anticipated.

Key Results

- The consolidation of securities exchanges will stop short of the formation of true global portals. Rather, regional securities exchanges will merge or otherwise close down
- Surviving securities exchanges will become increasingly similar in terms of technological inputs while retaining distinctive features of core competence.

Author

Steven Globerman**,** Kaiser Professor of International Business, College of Business and Economics, Western Washington University, Bellingham, WA 98225-9170
Phone: (360) 650-7708 Fax: (360) 650-4844 Email: steven.globerman@wwu.edu

Proposal for Abbreviated Heading

E-Business and Global Sourcing

INTRODUCTION

A widely acknowledged phenomenon associated with the introduction and spread of e-business practices is the formation of portals for “global” sourcing. In recent years, leading firms in a range of industries have established “group” Web sites to carry out on-line purchasing or sales of products (Globerman, 2000). The expectation is that global sourcing though the Internet will enable firms to leverage economies of scale and to greatly reduce transactions costs associated with using “conventional” channels for locating trading partners and organizing the relevant transactions. As a corollary, regional and local markets for the relevant transactions should contract, perhaps even disappear, given the presumed economic advantages of global portal “markets.”

The emergence and growth of global portals has potentially wide-ranging and profound implications for corporate and competitive strategies, as well as for public policy. For example, global sourcing through e-business will increasingly obviate the relevance of regionally oriented marketing and distribution activities, and should lead to further centralization of decision-making with respect to various stages of the logistics value-chain. It will also accentuate the benefits of coordinating competition and regulatory policies at a supra-national basis.

Notwithstanding the initial expectations regarding the revolutionary changes that global portals would bring about, the experience, to date, provides grounds for skepticism. Specifically, a substantial number of early e-business Web sites have been closed for lack of sufficient business. These include portals designed to accommodate business-to-business (B to B) e-commerce, the type of e-commerce expected to be characterized by the largest efficiency gains. The relatively slow acceptance of global portals, at least with respect to initial expectations, might merely reflect risk aversion and learning behavior on the part of potential users. Slow initial adoption tends to be characteristic of industrial innovations (Mansfield, et.al., 1977). On the other hand, it might reflect the limited advantages of global portals compared to purchasing in more localized markets. In particular, it might reflect an initial misperception about the

commercial consequences of e-business and, therefore, mistaken perspectives on the extent to which global sourcing will displace more localized industrial purchasing.

The purpose of this paper is to reconsider the potential impact of e-business on global sourcing. Specifically, we discuss the conceptual linkages between e-business and relevant geographic markets. The linkages identify influences that both encourage and discourage more centralized industrial product markets.[1] As a specific case study, we consider the experience, to date, of pan-national stock exchanges. That is, we consider whether and how e-business has contributed to the emergence of global, or near-global portals for the execution of stock market transactions undertaken by brokerage companies.[2] The case study helps explain the relatively slow acceptance of global portals by highlighting how e-business can enhance the competitive advantages of localized providers of industrial products.

The paper proceeds as follows. The next section sets out a conceptual framework that describes the general determinants of relevant geographic market size. The third section considers how e-commerce applications might affect the various determinants identified in the preceding section. Section four describes the rise of electronic stock exchanges and evaluates the growth of electronic stock exchanges against the inferences drawn from the conceptual framework. A summary and conclusions is provided in Section five.

LINKAGES BETWEEN E-BUSINESS AND GEOGRAPHIC MARKETS: A CONCEPTUAL MODEL

In this section we consider the potential for the emergence of global portals to affect the size of relevant geographic markets for products. In this context, global portals may be seen as sites on communication networks through which buyers and sellers can electronically form an agreement concerning the pricing and delivery of a particular good or service and complete the transaction through the delivery of the product or service as contracted. Within this broad definition, the communication networks can be private, quasi-private or public. In practice, the concept of e-business is inextricably linked to the Internet. Hence, for purposes of this discussion, portals for global sourcing of industrial

products should be seen as Internet Web sites providing for electronic transacting and, in some cases, electronic delivery of products. Examples of products that can be distributed over the Internet include software, ownership claims to financial securities, and consulting advice.

The presumed relationship between Internet portals and the size of relevant geographic markets derives from the presumed relationship between electronic commerce (e-commerce), more generally, and the geographic scope of competition. For economists, a relevant geographic market is defined as the smallest geographical area in which producers (acting as a monopolist) could implement a profitable price increase. There is a general consensus that e-commerce will result in both the expansion of relevant geographic markets and increased competition within those markets (Malone, Yates /Benjamin, 1987; Bakos and Brynjolsson, 1993 and Kobrin, 1995). The two changes are related. Specifically, as e-commerce makes it less costly to identify beneficial transactions across a wider range of potential transactors, it should lead to an increased integration of markets that are currently segmented by high transactions costs across geographical space. Furthermore, geographically larger markets are ordinarily more contestable than smaller markets. Contestable markets are characterized by relatively low costs of entry and exit such that incumbent firms must charge competitive prices even if there are only a small number of such firms (Baumol, Panzar/Willig, 1988). The Internet might directly increase contestability by enabling entrants to duplicate the “value-creating capabilities” of dominant firms with relatively low sunk cost investments (Kauffman, Subramani/Wood, 2000).

In short, to the extent that electronic portals significantly reduce transactions costs that are related to geographical distance, they could lead to a relatively small number of (electronic) markets servicing wide geographical areas. Moreover, to the extent that electronic portals are cheaper than conventional market alternatives, holding distance constant, the resulting lower costs will attract more customers, including those from relatively distant markets. Increased competition within geographical markets should insure that most, if not all, of the cost savings are passed on to consumers. Hence, the

emergence and growth of global portals is ultimately related to the impact that the Internet will have on distance-related, as well as non-distance related costs of performing specific transactions, as well as the degree of competition to pass on those cost savings to users.

The basic conceptual relationship can be elaborated upon with the help of Figure 1. The horizontal axis in Figure 1 measures ordinal distance. For convenience, we assume that consumers are distributed in an equi-proportionate fashion along the horizontal axis. The vertical axis measures consumer surplus associated with purchasing the product in question at the location indicated on the horizontal axis. It should be emphasized that all attributes of the product, other than the transaction's location, are implicitly held constant. Consumer surplus, in this case, can be thought of in the conventional way. Specifically, it is the difference between what consumers would be willing to spend to purchase the product and what they are required to spend by the market. The four geometric peaks shown in Figure 1 therefore represent the surplus that consumers receive from buying a product in the location in which they reside. The cost of buying the product reflects two main factors: the supplier's cost of producing the product and the supplier's cost of "transporting" the product. The lower are either or both of those costs, the larger the surplus that consumers realize assuming competitive pricing.

To elaborate upon Figure 1, the apex of each triangle represents the maximum attainable surplus associated with buying within a given geographical market. Thus, consumers buying from sellers in market 1 realize maximum surplus if they are located on the horizontal axis at the point that is directly below the apex. Consumers located at that point in space will not have to pay transportation costs, although they will pay the same "factory price" as any other buyer. As buyers are located further away from the point directly below the apex, they must incur costs associated with locating the seller, communicating with the seller and taking delivery of the product. The combination of all of these distance-related costs are identified, for convenience, as "transportation costs." As a result, given any factory price, buyers' surplus will decline the further away they are located from the apex. Given four (assumed) groups of sellers concentrated at the four

apexes shown in the figure, we have descending surplus values for consumers located at increasing distances away from each apex.

The four triangles represented in Figure 1 define the boundaries of the four relevant geographic markets. Specifically, customers located to the left of point A will find it more advantageous to buy from suppliers located directly below the apex in Market 1. Customers located between points A and B will find it advantageous to purchase from suppliers located directly below the apex labeled Market Two. Similarly, the distance between points B and C marks the boundaries of Market Three, while all customers located to the right of point C will buy from suppliers located below the apex of the triangle marked Market Four.

We now introduce an "electronic portal" into Figure 1. For convenience, we assume that the portal is "located" in the middle of the horizontal axis. We make two other assumptions: 1. The portal is more efficient than any of the conventional sellers represented in the original four triangles. 2. Transportation costs utilizing the portal do not increase as quickly with distance as they do using conventional technology. The import of the efficiency assumption is that the apex for the electronic market should be higher than the apex of any conventional market. That is, holding distance constant, it is assumed to be cheaper to use the electronic market than a conventional market. Therefore, consumer surplus will be higher in the electronic market, other things constant. The import of the transportation cost assumption is that the decrease in surplus from either side of the apex of the electronic market should be less steep than the decrease in surplus from the apex of a conventional market.

These basic assumptions are incorporated into the drawing of the surplus function for an electronic market in Figure 1. The main inference to be drawn is that the electronic market will eliminate the middle two markets (Markets 2 and 3), and substantially reduce the sizes of Markets 1 and 4. In the latter two markets, a relatively small group of consumers around the location directly under each apex will remain loyal to the conventional markets. It can be seen from the diagram that unless the apex of the

electronic market is substantially above the apexes of the conventional markets, the latter will not be completely eliminated, even with significantly more gradual declines in the surplus slopes away from the apex of the electronic market. That is, even relatively large differences in efficiency between electronic and conventional markets will likely lead to a consolidation of conventional markets rather than their complete elimination by global portals. Figure 1, as drawn, also shows that modest gains in efficiency using electronic portals may eliminate conventional markets that are relatively "contiguous" to the portals. Thus, the emergence of more efficient electronic markets is more likely to result in the growth of "regional portals" than in the growth of a single truly global portal.

POTENTIAL IMPACTS OF E-BUSINESS

In this section we consider whether and how serving customers from portals on the Internet might affect the surplus functions of consumers. Specifically, we consider whether such portals should have higher apexes than conventional markets and whether the surplus functions will descend more slowly from the apexes of portals.

Production Efficiency

Obviously, it is very difficult to generalize about how moving value-added activities onto the Internet will affect the basic costs of "producing" the product. Simply put, it will depend very much upon the nature of the underlying production function. For example, to the extent that electronic signals can easily substitute for physical inputs, and to the extent that the former are cheaper than the latter, moving relevant production activities onto the Internet might have substantial cost savings. A number of dramatic examples can be cited in this regard. One company, Micron Computers, reported a productivity gain of a factor of 10 in moving its order placement and execution online. The gain results from the fact that their Web sales people spend, on average, two minutes on the telephone with a customer who has looked at their Web site but 20 minutes with traditional customers (OECD 2000, p.60). Another company, Cisco Systems, claims to have saved over $500 million by moving its customer support activities online (Ibid). Cost -saving claims associated with the use of electronic communication networks are also dramatic. For example, it is estimated that the approximate 3,000 people who work

on the floor of the New York Stock Exchange cleared an average of 671,300 trades a day in 1999. By contrast, with only 85 employees, the electronic communication network, Island, cleared an average of 321,007 trades a day in the first half of 2000 (Barber/Odean, 2001).

While it is difficult to generalize about how widespread such cost savings might be, the direction of the effect is to make the relevant markets of electronic portals larger at the expense of conventional markets. Relating back to Figure 1, moving specific value-added activities onto the Internet should reduce production costs, on balance, in a variety of industries. This would lead to the apex for the electronic market surplus function increasing relative to those for conventional markets.

The implicit assumption, which might be made explicit at this point, is that sellers in conventional markets do not use the Internet to improve efficiency. Otherwise, the distinction between conventional and electronic markets would quickly become blurred. In practice, this assumption is much too severe. For example, conventional stock markets are increasingly using computer communication systems to carry out transactions with brokerage companies. Significant cost savings are undoubtedly realized from using such systems compared to more traditional telephonic and courier service linkages between brokers and stock exchanges. Nevertheless, there is a distinction between a portal on the Internet and private local or wide-area telecommunications networks. At this point in our discussion, we prefer to make a sharp distinction between electronic and conventional markets. In a later section, when we focus our discussion on stock exchanges, we shall acknowledge that conventional exchanges can lower their costs by selective use of the Internet.

Scale Economies

To the extent that the relevant new technology favors larger-scale production activity, the introduction of that technology should promote a consolidation of local and regional markets. However, unless the new technology is more effectively “exploited” by establishing and operating electronic portals, there is no reason to believe that the

expansion of relevant geographic markets will take place by global portals displacing local conventional markets. For example, it could take place through the consolidation of local conventional markets that results in a fewer number of conventional markets serving larger spatial markets. Again, the point is that the relative position of the apexes of the different markets portrayed in Figure 1 will depend upon the relative abilities of participants in the different types of markets to take advantage of technological change- in this case, using the Internet to carry-out production activities.

Transaction Costs

A broad category of "non-conventional" costs can be identified as "transaction costs". The costs of transacting are essentially comprised of the following components: (1) Search costs: the costs of physically searching for market information related to potential buyers, sellers, product availability, product quality, prices and so forth. (2) Contracting costs: the costs of creating and implementing contractual agreements. (3) Monitoring costs: the costs of ensuring that contractual commitments are satisfied. (4) Adaptation costs: the costs associated with negotiating and implementing changes to agreements over time.[3] These costs can be borne directly by the consumer or by firms serving the consumer. In the latter case, if markets are competitive, transaction costs will ultimately be passed-on to final consumers in the form of higher prices.

It seems obvious that various components of transaction costs will increase with distance between participants in the relevant markets. For example, relevant information about products that is gathered by "word-of-mouth" will be less readily available to individuals at greater distances from other buyers and sellers. As another example, the ability of consumers to "adapt" the terms and conditions of a sale, say by petitioning the seller for altered terms, will be weakened, or will necessitate increased expenditures of time and money, as distance between the buyer and seller increases. Indeed, to the extent that potential redress of original terms includes legal action, and to the extent that increased distance involves crossing national borders, the associated differences in the legal jurisdictions of the buyer and seller may make adaptation costs prohibitive for

small-scale market participants. Furthermore, language differences across countries make the contracting process more complex and costly.

Potential Impact of the Internet

It has been argued that the move towards directly transacting on the Internet is broadly driving transaction costs toward zero. A specific claim is that "large and diverse sets of people scattered around the world can now, cheaply and easily, gain near real-time access to the information they need to make smart decisions and coordinate complex activities" (Tapscott 2000, A38). Any conceptual evaluation of this claim requires a closer look at how moving transactions onto Internet portals will affect the various components of transaction costs.

Search costs

Economists identify a product as a pure "search good" if the important attributes of the product can be readily identified by the consumer prior to purchase. For example, attributes such as price, physical dimension, color and so forth are readily established through simple inquiry or inspection. In this regard, financial securities listed on major stock exchanges have attributes of search goods in that important properties of a security such as price, average trading volume and current dividend yield can be readily and easily determined prior to purchase.

Most discussions of the economic advantages of e-business focus on the reductions in search costs resulting from the increased ease with which information about observable market characteristics such as price, product availability and so forth can be obtained using the Internet. Since the costs of using the Internet are largely distance insensitive, the costs of search on the Internet should be relatively constant as a function of distance, whereas the costs of search through more conventional techniques, such as accessing and reviewing local media and the like, should increase consistently with a participant's distance from the geographical sources of local media outlets. In terms of the components of Figure 1, the slope of the surplus function as it descends from either side of the apex of the global portal should be much flatter than the slopes of the surplus functions as they

descend from the apexes of the conventional markets to the extent that claims about the Internet's impact on search costs are appropriate.

Product attributes such as reliability and ease-of -use may not be readily determinable through simple inquiry or inspection. In contrast to search goods, the key attributes of so-called experience goods can only be established by testing or sampling the product. For example, the ease-of-use and reliability of on-line stock brokerages are best established by real-time testing of the product offerings. In some cases, critical attributes of products can only be ascertained with repeated use. For example, the benefits of using any specific financial planner will become much clearer after a period of time. The latter type of product is usually referred to as a "credence good".

While it is widely acknowledged that the Internet is a robust tool for collecting information about search goods, the ability to electronically sample experience goods is expanding the scope for e-business to reduce distance-related costs of acquiring information about those types of goods, as well. As an example, on-line stock trading programs can be downloaded from the seller's Web site and tested by potential buyers. In the case of credence goods, sellers often try to reassure buyers about the claimed attributes of their products by investing in the creation and maintenance of brand names, by offering warranties and customer satisfaction guarantees and so forth. In this regard, it is much less clear how e-business will affect the economics of transacting in credence goods. Traditionally, large accumulated sunk costs in brand names, trademarks and even "bricks and mortar" facilities have been effectively hostages that firms have made available to potential customers in order to engender trust (Klein/Leffler, 1981). In the case of e-business, expensive Web sites can serve as potential hostages, although it is unclear whether they can do so as effectively as more traditional sunk cost investments. To the extent that they can, the costs of searching for credence goods may also become relatively insensitive to distance.

Other transaction cost components

In summary, e-business applications should lower distance-related search costs. However, it is less obvious how e-business will affect other components of transaction costs. One argument is that the widespread adoption of standardized electronic contracts will lower the average costs of "simple" contracting, especially for business-to-business transactions, since a repetitive activity with relatively high variable costs will be replaced by an activity with relatively high "once-and-for-all" fixed and sunk costs but relatively low variable costs. In fact, this is more a claim for economies of scale associated with e-business rather than an argument about the distance sensitivity of contracting costs under e-business versus conventional market techniques.

The practical relevance of the claim that the Internet will facilitate a higher degree of standardized contracting is uncertain. For one thing, there are unresolved legal issues surrounding the enforceability of e-commerce agreements, although recent legislation affirming that electronic signatures are as binding as non-electronic signatures on legal contracts points towards a resolution of those issues. For another, it is unclear that transactions between parties, including those who regularly do business together, are sufficiently standardized as to obviate the need for contract modifications on an ongoing and, perhaps, unpredictable basis. This caveat is especially relevant for international transactions where differences in legal regimes, contractual customs and so forth may oblige parties to enter into multiple agreements with a resulting loss of opportunities to standardize contracts and other agreements.

To the extent that the perceived risks of opportunistic behavior are no lower for e-business activities than for conventional commercial activities, electronic agreements may need to be at least as complex and as frequently adapted over time as non-electronic agreements. In this case, the use of Internet portals may have little direct impact on the costs of creating and enforcing commercial agreements. On the other hand, to the extent that the substitution of electronic portals for conventional markets significantly expands the relevant geographic markets for products, buyers and sellers of those products should experience lower costs associated with switching transactions partners. Lower switching costs, in turn, should reduce incentives for individual market participants to act

opportunistically, all other things constant, which, in turn, should reduce the costs of establishing, maintaining and enforcing contracts. Again, the reduction in relevant costs should be greater for participants located further from centers of conventional markets, since any increase in competition should be greater at the periphery of conventional markets.

Summary

In summary, the spread of e-business, with electronic portals effectively functioning as markets, should reduce distance-related transaction costs. All other things constant, this should expand relevant geographic markets and lead to the substitution of portals serving relatively broad spatial markets for more localized conventional markets. The magnitude of this phenomenon clearly depends upon the impact of e-commerce on distance-related transaction costs, and this could vary across product markets. On the other hand, it is less clear that the adoption of electronic portals will reduce non-distance related costs, such as production costs, relative to similar costs incurred through more conventional ways of carrying-out the relevant value-chain activities. In particular, in many cases it may not be possible to standardize the underlying electronic transactions so as to leverage latent economies of scale compared to conventional production techniques. In other cases, participants in conventional markets may also be able to exploit cost-saving benefits of computer technology so as to offset any cost-saving advantages that would be otherwise realized by transacting through Internet portals.

The conceptual framework described in this section leads to a prediction that e-business will result in an expansion of relevant geographic markets. It is much less supportive of a prediction that truly global portals will completely displace conventional markets in many, if indeed any, activities. To the extent that distance-related costs are reduced by e-business, there should be some consolidation of regional and local markets with regional Internet portals hosting the displaced transactions. However, unless e-business also reduces non-distance related costs substantially, transactions carried out close to the centers of major conventional markets may not migrate to Internet portals.

In the next section of the paper, we consider the early historical experience of electronic stock markets. In particular, we review this experience with a view towards assessing whether and to what extent it supports the broad inferences about global portals that are drawn from our conceptual framework.

ELECTRONIC STOCK EXCHANGES

Over the past few years, electronic communications networks (ECNs) have emerged as potential alternatives to conventional equity trading arrangements. An ECN is an automated trading system that disseminates orders to third parties and dealers and can execute such orders within the network itself. ECNs typically do not serve individual investors, but instead focus on brokers and institutional investors. The latter, in turn, are agents who buy and sell securities for the ultimate benefit of customers or shareholders, although brokerage companies are also major shareholders in a number of ECNs. The latter therefore function as exchanges in which buyers and sellers of securities transact with each other. However, they are not regulated as securities exchanges, as are conventional stock exchanges such as the New York Stock Exchange. Rather, they are regulated as broker-dealers. The regulatory status of ECNs is a potentially important issue in the competition between ECNs and conventional security exchanges, and more will be said about this issue in a later section.[4]

ECNs function by electronically posting orders to buy or sell specific quantities of a stock at a specific price. These orders are received from clients, and the computer systems automatically complete transactions internally when they find appropriate matches between buyers and sellers. When internal matches are not found, the ECNs post the orders on the National Association of Securities Dealers Automated Quote (Nasdaq) system as soon as an order becomes the network's best bid or offer for a stock (McAndrews and Stefanadis, 2000).

Analogies to Internet Portals

It should be noted explicitly that ECNs are not Internet portals in the conventional sense, in that they are private computer-communication networks rather than nodes of the

public Internet. However, the analogy to Internet portals is apt in comparison to the traditional market center approaches to trading securities. The New York Stock Exchange (NYSE) is the largest traditional stock exchange center. Trading on the NYSE is structured around a specialist. For each stock, one specialist has an exclusive franchise. As an agent, the specialist matches buy and sell orders and handles limit orders placed with brokers. As a dealer, the specialist sometimes posts his or her own price quotes on the market and trades from his or her own liquidity. The NYSE has an electronic transmission system through which member firms can place small market orders. However, orders are executed manually by the specialist.

The Over-the-Counter Market (OTC) also uses a specialist system to execute trading in stocks not listed on an exchange. The difference between the NYSE and the OTC is that the latter uses multiple specialists for individual stocks. For the OTC, brokers can route orders to specialist dealers by telephone or computer network. However, the dealer is responsible for execution. As in the case of the NYSE, the dealer possesses proprietary information about unexecuted limit orders which puts the dealer at a major advantage to non-dealer participants (McAndrews/Stefanadis 2000, p.2). Unlike the U.S., with its system of market makers and specialists, European bourses rely upon electronic order-matching systems.

The analogy between ECNs and Internet portals is suggested primarily by the fact that price quotations and limit orders must be displayed publicly by ECNs on the Nasdaq public exchange. This regulatory requirement effectively links ECNs with the broader public market for securities trading by allowing counter-parties to transact indirectly with the ECN. Specifically, regulatory requirements have the practical effect of requiring Nasdaq dealers to match ECN bid or ask prices if the latter are more favorable than the dealer’s quotations. As a consequence, even though most ECN trading ultimately is linked to trading over the counter on the Nasdaq, the prices of such trades arguably reflect broader public participation than trades executed through the traditional dealer-specialist route.

The theoretical potential exists for the ultimate interconnection of all conventional securities markets to ECNs though arrangements similar to those described above for the Nasdaq. With an evolution of the trading system to a relatively small number of relatively large ECNs, the analogy to a set of electronic portals carrying-out securities trading transactions would become closer. Indeed, the theoretical "limiting case" would be a small number of ECNs, indeed even a single ECN, that carry-out all securities trading at the wholesale level, thereby completely displacing the conventional dealer-specialist arrangements. In fact, initiatives undertaken by the Nasdaq in recent years can be seen as an attempt to set such an evolution of market structure in motion. The resulting experience therefore is potentially instructive of the linkages between spatial markets and e-business more broadly defined.

Organizational Changes By Securities Exchanges

ECNs rely primarily upon the quick routing and executing of trades, as well as set commissions per trade, to generate competitive advantages over conventional exchanges. To date, ECNs have done relatively little business directly linking buyers and sellers of securities while bypassing specialists and dealers on established stock exchanges. However, they have grown to account for almost half of the volume in trading of Nasdaq Stock Market-listed securities as of year-end 2000 (Kelly, 2001b).[5] The Nasdaq, in turn, has sought to establish outposts in Europe and Asia that would list fledgling overseas companies and then link those overseas market operations with Nasdaq's flagship U.S. market. Specifically, Nasdaq Japan operates as a section of the Osaka Securities Exchange. Nasdaq also acquired Easdaq, a Brussels-based pan-European stock market.[6] Nasdaq plans to link its U.S., European and Japanese operations with a common trade-clearing and settlement system within a few years. Hence, Nasdaq's electronic trading platform is arguably emerging as the most likely candidate for a global securities exchange portal.

Nasdaq Japan and Easdaq have apparently generated relatively little trading volume, to date, and have also failed to attract many stock market listings. Various reasons have been offered. One is that efforts to link local stock exchanges into a pan-national trade

clearing and settlement system are hampered by differences in cross-border regulatory and reporting procedures. Such differences substantially increase costs associated with processing trades across national boundaries and can make integration prohibitively costly.[7] In this regard, talks have been initiated by organizations from the U.S., Europe, Asia and Latin America that do clearance and settlement of securities transactions to see if better international cooperation in those activities can be realized (Garten, 2001). A second reason is that larger companies are reluctant to list on new Nasdaq exchanges given long-standing commercial and "personal" ties between company executives and officials of established local stock exchanges. The failure to attract new listings limits the growth of trading volume that, in turn, attenuates the ability of the new exchanges to exploit economies of scale associated with their technology platforms. In this regard, new exchanges face something of a "Catch 22" problem. Companies are reluctant to list their large capitalization stock on exchanges unless those exchanges can provide substantial liquidity to market participants. On the other hand, without a roster of listed large capitalization stocks, it may be difficult to generate customer interest in new exchanges.

A third reason with, perhaps, the most enduring significance is the response of conventional stock exchanges to the initiatives of new electronic trading platforms. In particular, conventional exchanges have sought to reduce the costs of trading and listing for their clients. One way has been through consolidations involving mergers and alliances to gain the advantages of economies of scale. Figure 2 provides a partial list of recently announced international mergers, joint ventures and other types of alliances involving national and regional stock exchanges. The industrial reorganization appears to be motivated by several objectives: 1) the facilitation of "after-hours" trading; 2) the sharing of costs of trading and settlement technology platforms; 3) the promotion of specialized listings and cross-listings of securities (Globerman, Roehl/Standifird, 2001). Disagreement about precisely how to achieve those objectives can limit the pace of this consolidation. A case in point is the failed merger between the London Stock Exchange and the Deutsche Bourse. However, the trend towards consolidation seems firmly in place.

A second set of initiatives by conventional stock markets relates to the adoption of new technology in order to lower costs and increase transacting speed. For example, the NYSE has updated its electronic order system designed to transmit market orders for share blocks of stock from member firms to the trading posts on the exchange floor (Westland/Clark, 2000). The updates have vastly expanded the capacity of the system to handle orders without delay. Conventional stock exchanges have also encouraged cross listing of shares to facilitate "24-hour" trading in specific stocks, thereby promoting a "virtual" global market for the shares of specific companies.

Notwithstanding the technological innovations undertaken by established conventional exchanges, swifter trade execution remains an advantage of ECNs. For example, the average turnaround time for an ECN-executed order is two to three seconds compared with twenty-two seconds for an order processed though the NYSE (Smith, Ip/Gasparino, 1999). Furthermore, emerging software developments promise to facilitate a much faster scanning of liquidity and price offerings across markets to allow execution of an order at the best price anywhere at a moment in time (Schmerken, 1999). This software can serve to effectively link different ECNs or other markets such that brokers can obtain the best terms-of-trade for their clients wherever a stock is traded. The potential exists for such software to move markets towards *de facto* global integration if not *de jure* integration. Indeed, the interest being shown by conventional exchanges in such software suggests the possibility that such integration might occur without a displacement of the conventional exchanges by ECNs.

In summary, the structural changes in securities markets associated with new computer communication technologies are broadly consistent with the conceptual model developed in Section 2. Specifically, by lowering costs associated with "producing" securities transactions, non-conventional markets threaten to take customers away from conventional markets. Notwithstanding regulatory and other barriers to the ability of individual ECNs to carry out transactions across national boundaries, the emergence of ECNs has led to the expansion of relevant geographic markets in securities trading at the wholesale level. To date, this has largely occurred as a result of mergers and joint

ventures among conventional, and, more often, regional stock exchanges in response to the competitive threat of ECNs. Conventional exchanges have also responded to the threat of ECNs by utilizing new technology to improve their own efficiency, and by undertaking initiatives, such as increased cross-exchange listing of securities, that have the practical effect of increasing the spatial distance over which conventional stock trading transactions occur.

Future Outlook

There is every reason to expect that technological changes in communications will perpetuate the market pressures generated by the growth of ECNs. As noted above, the emergence of "pricing engines" will improve the ability of brokers to identify the best buy or sell price for a security across different markets. One can therefore anticipate the development of interconnected ECNs, or interconnected conventional markets, in which a technology platform, perhaps maintained in a central location, routes buy and sell orders throughout the network (Schmerken, 1999). With the reduction, if not complete elimination, of regulatory and related idiosyncrasies surrounding national, and even regional stock markets, major further contractions can be anticipated in the number of conventional exchanges. The remaining exchanges will be larger and will serve a larger geographical area. At the same time, the desire for liquidity should lead to a contraction in the number of ECNs, as well.

It is unlikely, however, that an evolution towards truly global portals will occur. In particular, the ability of local specialists to provide services, such as supplying liquidity through their own intervention in the market, may be difficult to duplicate in a purely electronic market. Moreover, it is unlikely that any single exchange, whether purely electronic or not, will satisfy all market participants given the different emphasis placed on service attributes such as speed of execution, quality of information about listed securities, liquidity and so forth. Indeed, ECNs continue to differ in the extent to which they emphasize matching buying and selling orders internally versus acting as "order routers" to other exchanges (Ceron, 2001).

The reputations of established conventional exchanges for honest and “fair” dealing may also mitigate the technological advantages enjoyed by ECNs. The reputations of securities exchanges are, in turn, often linked to investor perceptions that those exchanges are “soundly” and effectively regulated. On this point, there is evidence that companies are rewarded, through lower capital costs, by listing their securities on exchanges with reputations for being effectively regulated (Standifird/Weinstein, 2002). As noted above, the ability to attract new listings from major companies is an important factor conditioning the growth of new securities exchanges. In this regard, the current regulatory status of ECNs might discourage such new listings. Currently, most ECNs are regulated as broker-dealers. As such, they are subject to oversight by self-regulatory organizations that themselves operate exchanges. In particular, ECNs are not subject to the same surveillance and examination procedures as conventional securities exchanges. Nor do they have an obligation to ensure that they have sufficient capacity to handle trading demand as do conventional securities exchanges.

The Securities and Exchange Commission (1997) has signaled its intent to alter domestic securities market regulations to acknowledge the changes that have been brought about by the Internet. It is likely that the ensuing changes will move the regulation of ECNs closer to that of traditional stock exchange markets. In doing so, the regulator will almost certainly inflict higher costs on ECN operations, while, at the same time, it’s actions will probably enhance the perception of market participants that ECNs operate as reliable and honest market clearing platforms. It is unclear whether the net result will be to improve or diminish the relative competitive position of ECNs.

It is less clear how the regulator will address foreign securities market activities in the United States. One possibility is that traditional exchange regulation will be applied to foreign securities markets that seek to do business in the United States. Another is that the U.S. regulator will rely solely on home country regulation of the foreign markets. Clearly, the growth of international securities exchanges will be promoted by the harmonization of national regulations, especially if the level of harmonization does not inflict undue costs upon newer pan-national markets. At the same time, investors have a

strong “home country bias.” Specifically, investors, including institutional investors, have a propensity to invest in local stocks and securities markets (Tse, 1999). One possible explanation of this propensity is that information about specific corporate securities is more readily available in regional and local markets, especially general information that is unlikely to be published (Coval/Moskowitz, 1999). The persistence of a home country bias on the part of investors reduces the appeal of having low-cost access to “foreign” securities markets, especially if the latter have disproportionately large listings of foreign corporate securities.

CONCLUDING COMMENTS

A broad inference that might be drawn from the securities exchange experience is as follows: e-business unambiguously contributes to the expansion of relevant geographic markets. However, the speed and extent to which spatial markets expand are conditioned by a host of factors. Some, such as government regulations and legislation, may be largely unrelated to technological and other developments driving the expansion of e-business, although the relevant new technologies may make it increasingly difficult for governments to use regulations to segment local markets from international competition. Others will be related to the competitive responses of participants in conventional markets including the latters’ willingness and ability to utilize new technology to lower their costs of production. Technological change, itself, will be important. In particular, the ability of technology to allow participants in a market, wherever they are located, to transact at the same speed as other participants is critical to building market liquidity.

Against the background of these factors to date, the securities exchange experience suggests that the emergence of truly global portals is unlikely, although there is likely to be a significant consolidation of existing markets. The consolidation could be a fairly lengthy process and will largely occur at the regional level, e.g. within Europe and North America. In short, the Internet should lead to smaller numbers of markets within major regions of the world with a resulting increase in cross-border trade within those regions. Furthermore, the widespread adoption of new communications technologies by operators

of traditional exchange markets will increasingly blur the distinction between electronic markets and traditional markets.

As noted above, ECNs are interesting cases to study in that electronic trading of securities has been at the forefront of the e-business phenomenon, at least at the retail level, and the fundamental importance of speed of information exchange and transaction execution in securities trading makes the adoption of new technology of great relevance to participants in that industry.[8] Hence, it might be argued that the consolidation of geographic markets in other industries, along with the emergence of cross-border electronic markets, will proceed at a significantly slower pace than in the securities industry. Nevertheless, managers who ignore the inevitable technological forces driving the closer integration of geographical markets are placing their organizations in serious competitive jeopardy.

Figure 1

Boundaries of Markets

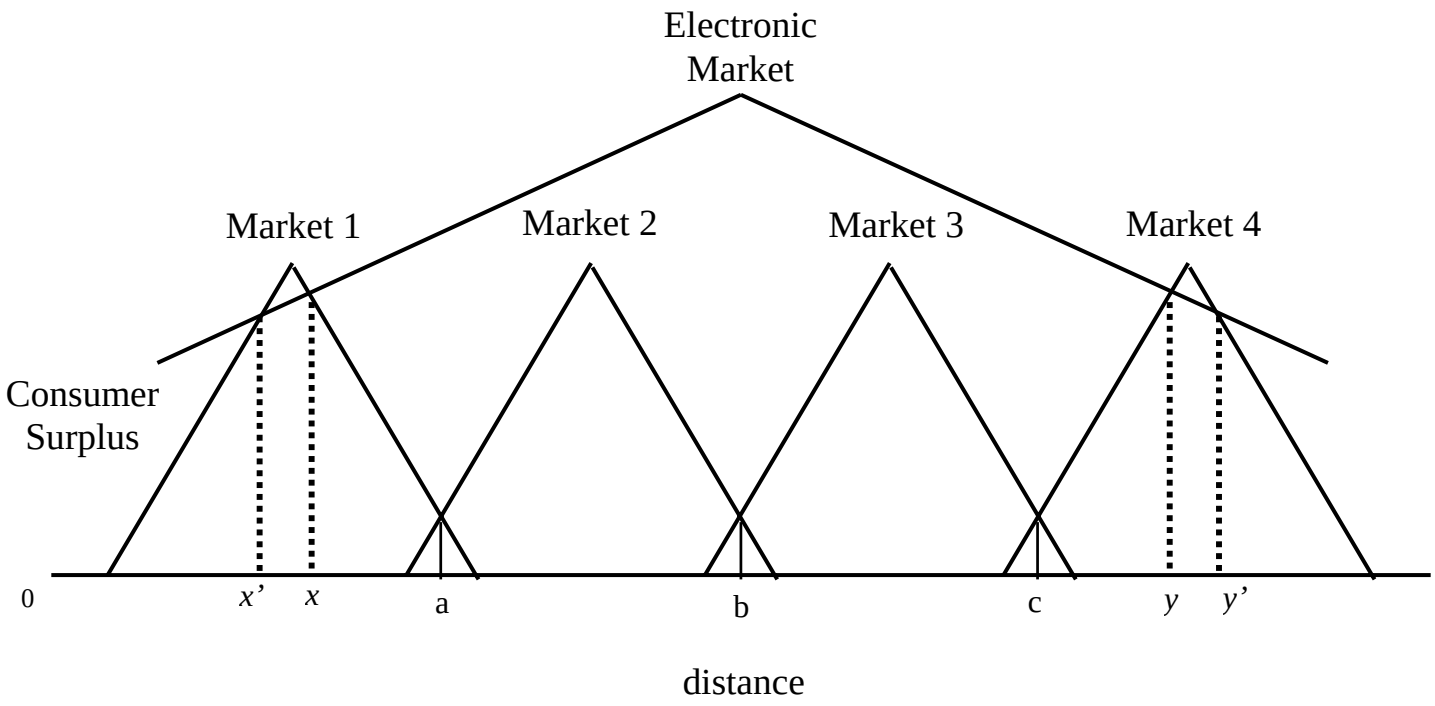

Figure 2
Mergers and Alliances Between Stock Exchanges

Exchanges	Features	Announcement Date
Singapore Exchange & Australian Stock Exchange (merger)	Link Trading and Settlement Systems	June 2000
Global Equity Market *	Pass Order Books across Time Zones	June 2000
Deutsche Boerse & London Stock Exchange (merger)	Share Trading and Regulatory Systems; Specialization by Security Type	April 2000
Deutsche Boerse & Market XT (joint venture)	Create an European Broker/Dealer Giving US Investors Access to European Blue Chips via Germany	April 2000
Nasdaq & Quebec Government (joint venture)	Co-Listing Agreement	April 2000
Nasdaq & Stock Exchange of Hong Kong	Trading Nasdaq Stocks in HK	June 2000
Copenhagen Stock Exchange & Stockholm Stock Exchange (Alliance)	Integrated Trading, Clearing & Settlement Systems	January 1998
Swiss Exchange & Tradepoint Financial Network	Integrated Settlement Systems	May 2000
London Stock Exchange & Deutsche Boerse	Integrated Trading, Clearing & Settlement Systems	Not Completed

* A venture involving the New York, Toronto, Tokyo and Hong Kong exchanges and bourses in Paris, Amsterdam, Australia, Brussels, Mexico and Brazil.

Source: Newspaper Reports

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ENDNOTES

[1] We focus on industrial product markets, since they are more likely than retail consumer markets to become more centralized. For example, retail consumers face much higher information and transportation costs related to distance than do industrial customers. Certainly, if global portals do not "catch on" with industrial customers, they will be a much harder "sell" to retail customers, notwithstanding E-Bay's apparent success.

[2] A focus on brokerage companies, rather than brokerage customers, is consistent with an examination of industrial product markets rather than retail markets. For an analysis of the impact of e-commerce on the retail brokerage sector, see Globerman, Roehl and Standifird (2001). For a broader examination of the impact of the Internet on investor behavior, see Barber and Odean (2001).

[3] This categorization of transaction costs is discussed in Wigand (1997). An important component of search activity is the verification of the claimed attributes of products. Where it is difficult for producers to validate their product claims, markets may be characterized by a "lemons" problem, and reliable producers may be driven from the market. For a discussion of this phenomenon on the Internet, see Lu (1998).

[4]Along with ECNs, there are other types of alternative trading systems. For example, crossing networks temporarily aggregate liquidity by matching submitted bids and offers for securities at distinct times of the day. The latter are not regulated, either as brokers or security exchanges, and they process a relatively small share of total securities transactions. For a description of the various alternative trading systems, see Barber and Odean (2001).

[5] The oldest and historically the largest electronic stock-trading platform is operated by the Instinet Group. The latter accounted for almost 30% of ECN-generated Nasdaq trading volume in 2000. The next largest 5 ECNs accounted for essentially all of the rest of ECN-generated Nasdaq trading volume (Kelly 2001a, C1). It was recently reported that Island ECN has overtaken Instinet as the top electronic stock trader by market share (Kelly and Frank, 2002). Moreover, a planned merger between two other ECNs (Archipelago and Redibook) will leave the merged entity with a larger market share than Instinet (Kelly, 2001b).

[6] These initiatives are discussed in "Nasdaq's Drive to Build Global Exchange Hits Some Major Potholes", *The Wall Street Journal*, June 25, 2001, A1, A6. Two recently established joint ventures between NASDAQ and regional stock markets outside the United States are identified in Figure 2 along with a number of announced mergers between established stock exchanges. The relevance of the merger trend will be discussed in a later section. It might be noted that several start-ups have also recently announced that they will launch pan - European exchanges. See Ascarelli (2001).

[7] See "Taking one's Easdaq," *The Economist*, February 3, 2001, p.77. To some extent, computer technology is driving down costs of settlement procedures by automating manual clearance procedures and by assisting brokers to compare costs of different suppliers of clearance and settlement services and bypass the least efficient suppliers. See "the hunt for liquidity," *The Economist*, July 28, p.65.

[8] Ultimately, changes at the exchange level will also be influenced by the demand for electronic trading at the retail level, since it is the customer's demand for rapid execution at the best possible price that will drive demand for fast and liquid electronic markets. For an assessment of the outlook for Web-based stock trading at the retail level, see McNamee (2001).