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Creating Securities Markets in Developing Countries: A New Approach for the Age of Automated Trading*

Benn Steil

Council on Foreign Relations.

Abstract

The past decade has been one of enormous change in the securities trading industry. Automation of trading systems, led by the continental European exchanges and US 'electronic communications networks' (ECNs), has resulted in significant declines in trading costs, massive increases in turnover, internationalization of trading and settlement system operations, and major reforms in exchange governance. Yet the policy advice given to developing country governments looking to create or expand securitized finance in their markets has been largely unaffected by these developments. This is unfortunate, as developing countries now have the opportunity to leapfrog the evolving infrastructure of the mature markets and to define the global efficient frontier in trading technology, exchange governance, investor access and market structure regulation. This paper analyses the technological and economic forces driving change in the securities trading industry, and examines the implications for developing markets.

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I. Introduction

Facilitating the growth of securitized financing in poorer countries, particularly those which already have an effective commercial banking sector, has long been considered an important component of the economic development process. Although enthusiasm in the economic policy literature for creating stock markets waned briefly in the late 1980s and early 1990s, when economic growth was slower in the USA and UK than in the more bank-centred markets of Japan and Germany,[1] there is now widespread recognition of their central role in ensuring adequate financing for growing enterprises and in promoting domestic investment and wealth creation.[2] Among the benefits they bring, the following are perhaps the most salient:

- They increase the economy-wide mobility of productive resources.
- They represent a highly efficient mechanism for channelling local savings to investments.
- They allow efficient reallocation of financial risks.
- They dramatically increase the scope for foreign financing.
- They complement, rather than substitute for, the development of the banking sector.[3]
- Empirically, equity investments in developing countries appear to offer more attractive risk-return profile than debt.[4]
- Countries with more liquid stock markets enjoy faster growth rates of real per capita GDP over subsequent decades.[5]
- Stock markets are critical to the development of venture equity financing, as they provide an essential exit mechanism for venture capitalists, who are therefore able continuously to reallocate their capital towards new promising enterprises.

While endorsing the efforts of governments in poorer countries to facilitate the development of domestic securities markets, in this paper I argue against the grain of much of the policy literature in developmental economics, and advocate a highly circumscribed role for government in the actual creation and management of exchanges and related trading institutions, such as central securities depositories (CSDs). Instead, governments should focus on the

[1]See, for example, Porter (1992) and, very notably, Singh (1993).

[2]See, for example, Economic Development Institute of the World Bank (1997).

[3]See Demirgüç-Kunt and Maksimovic (1996) and Garcia and Liu (1999).

[4]See, for example, Buiter et al. (1999).

[5]See, for example, Levine and Zervos (1996) and Rousseau and Wachtel (2000).

establishment of a legal and regulatory framework that would encourage existing purveyors and operators of trading infrastructure outside the country to offer services locally. This would serve to facilitate the domestic market's integration into a burgeoning *international* marketplace for equity transaction services, enabling both rapid absorption of the most successful trading and settlement technology and lower capital costs for growing local enterprises. I begin by examining the impact of trading automation on the governance and strategic positioning of exchanges in the advanced economies, and then move on to draw out the implications for countries which are considering how best to expand domestic access to both local and foreign equity capital.

II. Technology and Exchange Governance

The traditional model of an exchange as a locally organized mutual association is a remnant of the era before trading system automation. As trading required visual and verbal interaction, exchanges were necessarily designated physical locations where traders would meet at fixed times. Access to the exchange had to be rationed to prevent overcrowding and, when single-price periodic call auctions were prevalent, to ensure that simultaneous full participation was physically feasible.

As trading 'systems' were simply rules governing the conduct of transactions, exchanges were naturally run by the traders themselves as co-operatives. Rationing access was generally done through a combination of substantial initial and annual membership fees, to ensure self-selection by high-volume users. Non-members naturally wished to benefit from the network externalities of concentrated trading activity (commonly referred to as 'liquidity'), and therefore paid members to represent their buy and sell orders on the exchange floor. This is how exchange members came to be intermediaries ('brokers') for investor transactions.

The economics of automated auction trading are radically different. The placement and matching of buy and sell orders can now be done on computer systems, access to which is inherently constrained neither by the location nor the numbers of desired access points. In a fully competitive 'market for electronic markets', the traditional concept of membership becomes economically untenable. As the marginal cost of adding a new member to a trading network declines towards zero, it becomes infeasible for an exchange to impose a fixed access cost, or 'membership fee'. Rather, only transaction-based (that is variable cost) charging is sustainable. The transactors on such electronic networks, therefore, come to look much more like what are normally considered 'clients' or 'customers' of a firm than 'members' of an association. And since an electronic auction system is a valuable proprietary product, not costlessly replicable

by traders, it is feasible for the owner to operate it, and sell access to it, as a normal for-profit commercial enterprise. This contrasts with a traditional exchange floor, whose value derives wholly from the physical presence of traders. A private operator could offer traders nothing more than access to commercial real estate.

The fact that an automated exchange can be operated as a commercial enterprise, unlike a traditional floor-based exchange, does not, in itself, make a case for a corporate rather than mutual governance structure. However, such a case emerges naturally from an analysis of the incentive structures under which a mutualized and corporate exchange operates. Exchange members are the conduits to the trading system, and they thereby derive profits from intermediating non-member transactions. They can, therefore, be expected to resist both technological and institutional innovations that serve to reduce demand for their intermediation services, even where such innovations would increase the economic value of the exchange itself. If the members are actually *owners* of the exchange, they will logically exercise their powers to block disintermediation where the resulting decline in brokerage profits would not at least be offset by their share in the increase in exchange value.

Because a major economic benefit of automated auction trading is the elimination of the need for trade intermediation, mutualized exchanges can be expected both to have difficulties introducing such systems and, once introduced, allowing their full potential to be exploited by non-member investors. Both of these effects can be well documented. The largest UK-based market-makers on the London Stock Exchange fought to block the adoption of electronic auction trading in the mid-1990s. New York Stock Exchange (NYSE) specialist firms have long fought against automated matching of investor orders and display of their limit order books to the trading floor and the wider public. Nasdaq market-makers blocked the incorporation of mandatory price-time priority in Nasdaq's trading system upgrade (SuperMontage), successfully arguing that customers should be allowed to trade with them even if they were not posting the best price, or the earliest best price (they could simply match the best posted price). Non-member-based commercial trading system operators, on the other hand, have always chosen both to operate automated auction structures and to do so without any intermediation requirement (except for retail orders, for which such operators have traditionally not wished to manage the credit risk function).

What are the costs to investors and listed companies of exchanges continuing to operate as broker-dealer co-operatives? Recent empirical evidence makes this very clear: significantly higher trading costs (and therefore lower returns) to investors, and higher capital costs to listed companies. Domowitz and Steil (2001) estimate total trading costs to be 28–33% higher through NYSE and Nasdaq traditional broker members than through non-intermediated

for-profit trading system operators (now commonly referred to as ECNs). They estimate that European trading fees alone would fall a massive 70% if the European exchanges were to move to an ECN governance model: that is, eliminating membership and allowing direct investor access. Historically, mutualized exchanges have sought to fix commissions and prevent price competition.[6] For-profit non-member-based trading system operators, on the other hand, have the opposite incentive: to mitigate access costs to their system imposed by intermediaries. In developing markets, facilitating the emergence of commercial rather than mutualized trading operations should, importantly, result in lower capital costs to domestic listed companies. Domowitz and Steil (2001) demonstrated that distintermediating trading reduced trading costs, and that trading cost reductions, in turn, reduced the cost of raising equity capital. The halving of total trading costs which they document in the USA between 1996 and 1998 resulted in an 8% decline in equity capital costs to S&P 500 companies. Domowitz and Steil further estimate that the elimination of mandatory broker intermediation at the European exchanges would result in at least a 7.8% savings to European blue-chip companies.

A. Demutualization

Stockholm was the first stock exchange in the world to demutualize, doing so in 1993. The initiative came on the back of major competitive inroads into Swedish equity trading made by London's SEAQ-International between 1987 and 1990, a period in which Stockholm's turnover declined by a third and its market share of global reported Swedish equity turnover dropped as low as 40%.

Half of the shares in the new Stockholm corporate structure were retained by the members, and half were allocated to listed companies. The shares became freely tradable in 1994 and, in 1998, they were listed on the exchange itself. Following the demutualization, the exchange became the first in Europe to offer remote cross-border membership (1995) and direct electronic access for institutional investors (1996), although trades must still be notionally executed via a sponsoring member. Local Swedish members resisted both of these initiatives but could not block them given their minority interest.[7] The new non-member owners, in contrast, had an unambiguous incentive to support these measures. The exchange as a commercial enterprise appeared to have performed well following the demutualization. Turnover quadrupled in

[6]For example, Banner (1998) notes that from the NYSE's founding 'the Board organized brokers into a classic cartel with respect to brokerage commissions' (p. 266).

[7]Anecdotal evidence from exchange officials suggests that smaller local members did, in fact, suffer financially from a diversion of foreign order flow to the new, larger remote intermediaries.

the first two years of demutualized operation, and the exchange's share price rose nearly sevenfold.[8]

The Stockholm model has since been widely emulated by other automated exchanges. Table 1 documents demutualizations. The biggest difference among them has been in the initial allocation of shares. Helsinki and Copenhagen, for example, applied a 60–40 share split between members and listed companies. Amsterdam allocated 50% to members and auctioned off 50% to both listed companies and institutional investors. Australia allocated all shares to the

Table 1: Exchange Demutualizations

Exchange	Year
Completed demutualizations	
Stockholm Stock Exchange	1993
Helsinki Stock Exchange	1995
Copenhagen Stock Exchange	1996
Amsterdam Exchanges	1997
Borsa Italiana	1997
Australian Stock Exchange	1998
Iceland Stock Exchange	1999
Athens Stock Exchange	1999
Stock Exchange of Singapore	1999
SIMEX	1999
LIFFE	1999
Toronto Stock Exchange	2000
Sydney Futures Exchange	2000
Chicago Mercantile Exchange	2000
New York Mercantile Exchange	2000
London Stock Exchange	2000
Deutsche Börse	2001
Oslo Exchanges	2001
Euronext	2001
Agreements or board proposals for demutualizations and public offerings in 2001	
Chicago Board of Trade	
Chicago Board Options Exchange	
Hong Kong Stock Exchange	
International Petroleum Exchange	
London Metal Exchange	
Nasdaq	
Nymex	
PCX Equities	
Sydney Futures Exchange	

[8]The exchange itself credits part of the increase in turnover to the removal of a 1% transaction tax at the end of 1991, according to Rydén (1995).

members but listed them on the exchange itself the day following the demutualization.

Member-based exchanges are demutualizing so as to approximate better the incentive structure of a public company with a diversified shareholder base. In contrast, trading system operators in the USA and UK that have entered the market with automated auction products have avoided the mutual structure entirely. US operators such as Instinet, POSIT, B-Trade and Archipelago are formally regulated as brokers, but sell order-matching services on a transaction fee basis direct to institutional investor-clients.

III. Forces for International Exchange Consolidation

Every exchange in Western and Central Europe is now using the same basic architecture for their primary trading platform: the continuous electronic auction market, where matching buy and sell orders are automatically executed by computer. As the trading firms dominating these exchanges are increasingly major international banks, and increasingly trading cross-border (particularly from London), member-firm allegiances to national exchanges are naturally dying away, and issues related to reducing pan-European trading costs are coming to the fore. The banks must pay membership fees to each national exchange and bear significant internal access costs for each of the trading system and settlement linkages they maintain. The launch of the euro has accelerated the shift from country-based portfolio management to international sector-based investment, yet cross-border settlement costs in Europe are generally upwards of ten times domestic settlement costs. The international banks are therefore bringing increasing pressure to bear on the exchanges and CSDs to consolidate their systems, and, in some cases, to merge their organizations outright.

The trend towards the internationalization of exchanges is clear. Table 2 documents agreements to link automated exchanges which were launched between 1997 and 2001. These are classified into four broad categories: strategic alliances and joint ventures, common access systems, common trading systems, and mergers. Given the size of this list, it is particularly notable that these types of consolidation initiatives were relatively few and far between prior to 1997.

An example of the strategic alliance strategy is that implemented by the Chicago Mercantile Exchange (CME) and MATIF. The CME has adopted the MATIF NSC-VF trading technology as the basis for its own electronic trading system, and MATIF has adopted the CME's clearing system.

A deeper form of alliance is exemplified by the creation of a common electronic system to access multiple exchange systems, a strategy agreed by eight

Table 2: Automated Exchange Mergers and Alliances, 1997–2001

Merger or alliance	Status
Exchange mergers	
AEX: Amsterdam Stock Exchange and European Options Exchange	I
HEX: Helsinki Stock Exchange and SOM	I
BEX: Brussels Stock Exchange and BELFOX	I
OM Stockholm Exchange: Stockholm Stock Exchange and OM	I
Wiener Börse and ÖTOB	I
Paris Bourse and Monep	I
Paris Bourse and MATIF	I
Borsa Italiana and MIF	I
Eurex: DTB and SOFFEX	I
NYBOT: Coffee, Sugar & Cocoa Exchange and NY Cotton Exchange	I
Singapore Exchange: Stock Exchange of Singapore and SIMEX	I
Euronext: Paris, Amsterdam, and Brussels exchanges	I
virt-x: Tradepoint and Swiss Exchange (blue chip equities)	I
Archipelago ECN and PCX equities	I
HEX and Tallinn Stock Exchange	A
Hong Kong Stock Exchange and Hong Kong Futures Exchange	A
Bovespa (Brazil) and BVRJ	A
International Petroleum Exchange and Intercontinental Exchange	A
Chicago Board of Trade and Chicago Board Options Exchange	N
MATIF and MEFF	N
Alberta Stock Exchange and Vancouver Stock Exchange	N
BVLP (Lisbon) and Oporto Derivatives Exchange	N
Euronext and BVLP (Lisbon)	N
Eurex Bonds and EuroMTS	N
Common trading system	
Oslo Stock Exchange and OM (derivatives)	I
FUTOP (Denmark) and OM (derivatives)	I
Norex: OM Stockholm Exchange and Copenhagen Stock Exchange	I
Deutsche Börse, Wiener Börse, and The Irish Exchange	I
Eurex and HEX	I
Chicago Board of Trade and Eurex	I
NEWEX (central and eastern European equities): Deutsche Börse and Wiener Börse	I
Norex and Oslo, Reykjavik, Riga, and Vilnius exchanges	A
International Petroleum Exchange and Nord Pool	A
Globex Alliance: Chicago Mercantile Exchange, MATIF, MEFF RV, Singapore, Montreal, and BM&F (Brazil)	A
ParisBourse and Australian Derivatives Exchanges	A
Euronext and Bourse de Luxembourg	A
Common access system	
MATIF and MEFF RV	I
Chicago Mercantile Exchange and LIFFE	I
Euro-Globex Alliance: MATIF, MEFF RV, and MIF	A
SWIFT-FIX access protocol: Amsterdam, Brussels, Frankfurt, London, Madrid, Milan, Paris, and Zurich	A

Table 2: (continued)

Merger or alliance	Status
Strategic alliance/joint venture	
Benelux exchanges	I
Globex: Chicago Mercantile Exchange and MATIF	I
Cantor Financial Futures Exchange: Cantor Fitzgerald and New York Board of Trade	I
MITS: London Metal Exchange and MG	I
OM Gruppen and NGX	I
Nasdaq Japan: Nasdaq and Osaka Securities Exchange	I
Nasdaq and Hong Kong Stock Exchange	I
Chicago Board Brokerage: Chicago Board of Trade and Prebon Yamane	I
Nasdaq and Australian Stock Exchange	A
NYMEX-SIMEX	A
ParisBourse, Swiss Exchange, Borsa Italiana, and Lisbon Stock Exchange	A
London Stock Exchange and Buenos Aires Stock Exchange	A
Nord Pool and Leipzig Power Exchange	A
Australian Stock Exchange and Singapore Exchange	A
Chicago Mercantile Exchange and Cantor Fitzgerald	N
International Petroleum Exchange and NYMEX	N
Eurex and NYMEX	N
GEM: Amsterdam, Australia, Bovespa (Brazil), Brussels, Hong Kong, Mexico, New York, Paris, Tokyo, and Toronto exchanges	N
Chicago Board Options Exchange and Osaka Securities Exchange	N
LIFFE and Boston Stock Exchange (options trading)	N

Note: I, implemented; A, agreed; N, being negotiated.

European stock exchanges – London, Frankfurt, Paris, Amsterdam, Zurich, Milan, Madrid and Brussels – but subsequently abandoned. It is important for developing countries to take note of the fact that the evidence to date suggests that common access systems are generally far more complex and costly than anticipated when first widely proposed, in the late 1990s. Few of them have been successfully implemented, indicating that linking a national system to foreign systems is simply not a cheap and easy alternative to systems consolidation. Although order-routing systems operated by companies such as Instinet, ITG and royalblue have demonstrated that common electronic interfaces can indeed be commercially viable, it would appear that the conflict of interest among exchanges considering interlinkage has been the primary source of difficulties with this strategy.

The Norex alliance between OM Stockholm Exchange and the Copenhagen Stock Exchange goes a step further, producing a single trading system, based on the Stockholm SAXESS technology, to trade both Swedish and Danish

stocks. Although the exchanges remain separate legal entities, members of one are offered free membership of the other. The Oslo, Reykjavik, Riga and Vilnius exchanges are expected to join the common trading system beginning in 2001. The CBOT and Eurex have implemented a similar strategy, deepening an earlier one based on the model of a common access system.

The most notable example of a fully consummated exchange merger during this period is Eurex, which combined Deutsche Börse's DTB derivatives arm with the Swiss Exchange's SOFFEX derivatives arm into a single corporate entity, utilizing a common trading system. The Euronext merger of the Paris, Amsterdam, and Brussels exchanges has, at the time of writing, not yet consolidated equity or derivative trading platforms. The virt-x exchange is a product of the Swiss Exchange (SWX) taking a 38.9% equity stake in London-based Tradepoint. virt-x transferred Tradepoint's pan-European blue-chip equity trading to the SWX System on 25 June 2001, with the Swiss Exchange legally migrating all of its Swiss blue-chip order flow to the new entity.

IV. Major Issues in Securities Market Development

As in other areas of the economy where technological innovation has wrought revolutionary changes in products and services, such as mobile communications, developing countries actually benefit from not having to adapt or replace inferior legacy systems. As can be seen from the European and, particularly, American experience, the transformation of exchange technology and governance structure can be a complex, time-consuming and costly process. Developing countries with no legacy of a government-controlled or mutualized exchange – or no legacy with strong political or economic vested interests to protect it – are in a position to facilitate the rapid emergence of the most efficient institutional and technological infrastructure for trading. We discuss below the key decisions that need to be made.

A. Exchange Governance

The development of commercial, for-profit trading system operators should be considered a priority. Mutualized exchanges entrench intermediary control of market development and are less able to innovate and react to the demands of investors and issuers.

Should developing countries perhaps see the creation of a national mutualized exchange as a preliminary step to eventual liberalization of market structure rules and demutualization of the exchange? There are dangers in this phased approach.

Building obligatory broker-intermediation into the trading structure encourages the growth of questionable business practices between brokers and institutional investors that can result in excessive investment costs for domestic fund holders and forestall later progress towards non-intermediated trading. Specifically, brokers have learned to package non-trade-execution activities (such as research, computer systems and IPO access) into institutional trading commissions, allowing institutions to use client assets to pay for services which they would otherwise have to pay for themselves (or pass on to clients transparently through the management fee). Otherwise known as 'soft commissions' or 'bundled commissions', this practice is widespread in the USA, which explains why weighted average agency commission rates fell only 10% from 1994 to 1998, from 6.1 cents per share to 5.5 cents per share (Greenwich Associates, 1999), in spite of trading volumes climbing fourfold over this same period.[9] This compares with non-intermediated electronic trading commissions of 0.25–2 cents per share currently prevailing in the US market. Studies further indicate that paying higher institutional commissions does not result in lower implicit execution costs: in fact, there appears to be a positive correlation between the two.[10]

In short, the ability of brokers both to apply their strategic control over the exchange and to exploit payment monitoring problems in the fund manager–fund holder relationship can impose significant transition costs when moving from a mutualized national exchange structure to a structure based on competitive non-intermediated trading system operators. Developing countries should, therefore, consider seriously adopting the competitive operator model as early as possible in the development of their capital markets.

B. Build Versus Buy

Around the world, most notably in Europe, the 1990s was a decade of enormous wasted investment in redundant trading and settlement systems. Despite the fact that virtually every trading system implemented in Europe during these years applied the same market architecture (the continuous electronic auction), almost every exchange decided to build its own proprietary

[9]The value of shares traded in the USA rose from $3.56 trillion in 1994 to $13.15 trillion in 1998 (Securities Industry Association, 1999).

[10]See Berkowitz et al. (1988), which explicitly adjusts for trade difficulty. The findings of Domowitz and Steil (1999), which compared execution costs between 'traditional' brokers and execution-only electronic trading service providers, are consistent. Keim and Madhavan (1997) find a positive correlation coefficient between explicit and implicit costs of 0.14 for sells and 0.07 for buys.

version. Within a few years, most were making plans to abandon their investments and to adopt another exchange's system in response to pressure from the major international trading houses to begin consolidating platforms. Deutsche Börse and the London Stock Exchange each paid Andersen Consulting over $100m to build separate systems applying identical architectures, but on incompatible hardware platforms. This proved to be a critical barrier to the successful completion of their proposed alliance in 1998 and merger in 2000.

In less politically sensitive sectors of the economy, the 'build versus buy' decision is a straightforward matter of cost–benefit analysis. The exchange business should be no different. With few exceptions, fledgling exchanges should find it most cost-effective to buy, lease, or pay for access to trading and settlement systems already in operation elsewhere. Once built, the cost of adapting such systems to new products is almost always minimal compared with the cost of creating a new system.

Tradepoint's system – conceived, designed, and implemented between 1992 and 1995 – was built for approximately $9 million: $2.5 million to license the source code from the Vancouver Stock Exchange, and about $6.5 for in-house redevelopment.[11] The system was constructed to support 8–10 transactions per second (as compared with about 70 per second for the current virt-x system, adapted from the Swiss SWX system), a capacity more than sufficient for most developing markets. A similar platform in today's technology environment could almost certainly be built at well under a quarter of what it cost Tradepoint.

C. Ownership

Even more fundamental than the 'build versus buy' decision is the question of whether a domestically *owned* exchange must operate the trading infrastructure. Another option is to contract a developed market exchange to manage the trading infrastructure on its existing platforms. The owners of systems in use in the largest markets have a powerful commercial incentive continuously to improve their functionality and robustness, thereby insuring exchanges contracting their services against the risks of obsolescence. In fact, if no foreign trading and settlement system operators are interested in competing for such business, the government needs seriously to re-evaluate whether the existing political or legal framework is even capable of nurturing a successful equity market.

Given the extent of the literature highlighting the importance of stock markets as an element of a country's financial infrastructure, it may appear

[11]Other start-up costs, covering items such as staffing, legal bills for regulatory approval, and clearing and settlement arrangements, amounted to about $7 million.

strange to suggest that there is no need for governments actually to 'create' them, or to ensure that ownership of exchanges remain local. However, computer and telecommunications technology are also widely seen as vital to economic development, yet few, if any, political leaders would maintain that their countries must design and produce laptops and cell phones in order to develop. If the local market demand exists, and the local resources are available to purchase them, there will be ready and enthusiastic suppliers from around the globe. If neither is there, however, public investment to create a domestic securities industry will only serve to destroy scarce economic resources.

As illustrated by Domowitz and Steil (1999, 2001), investors and issuing companies suffer significant economic costs from inefficient trading structures and excess intermediation. Developing countries must therefore avoid the temptation to use exchange-building as an employment scheme for excess civil servants, bankers and aspiring local technologists.

It is important to recognize that the structure of a genuinely efficient exchange will look the same whether the ownership is local or foreign. As in other industries, the nationality of ownership should not have a determinant effect on the optimal level of local management and staffing. But foreign ownership is likely to be able to exploit excess systems capacity abroad, thereby yielding significant operating cost savings locally. In the future, it is highly likely that local exchanges will, as a matter of course, have a trading system supplier in one country and a settlement supplier in another, and those suppliers may themselves have computer operations in third countries (Figure 1). Thus, in terms of technological infrastructure, the local exchange may have responsibility for nothing more than maintaining the local network servers. Its primary responsibilities are likely to focus on relations with client traders and infrastructure suppliers.

D. Remote Foreign Access

We will not revisit here the debate over the costs and benefits of foreign portfolio investment flows. We need only emphasize that if foreign participation in local equity trading is to be accommodated, it is not in the interests of foreign investors, local investors, or local listed companies for such trading to have to be facilitated through physical local offices of foreign banks, or intermediated by local financial institutions. These merely add to the cost of market access: Domowitz and Steil (2001) found that every 10% decline in trading costs yields an 8% increase in US and European blue-chip trading volume. Remote foreign 'membership' should therefore be actively encouraged as a means of increasing market liquidity, reducing trading costs, and reducing the cost of equity capital to local listed companies. Importantly,

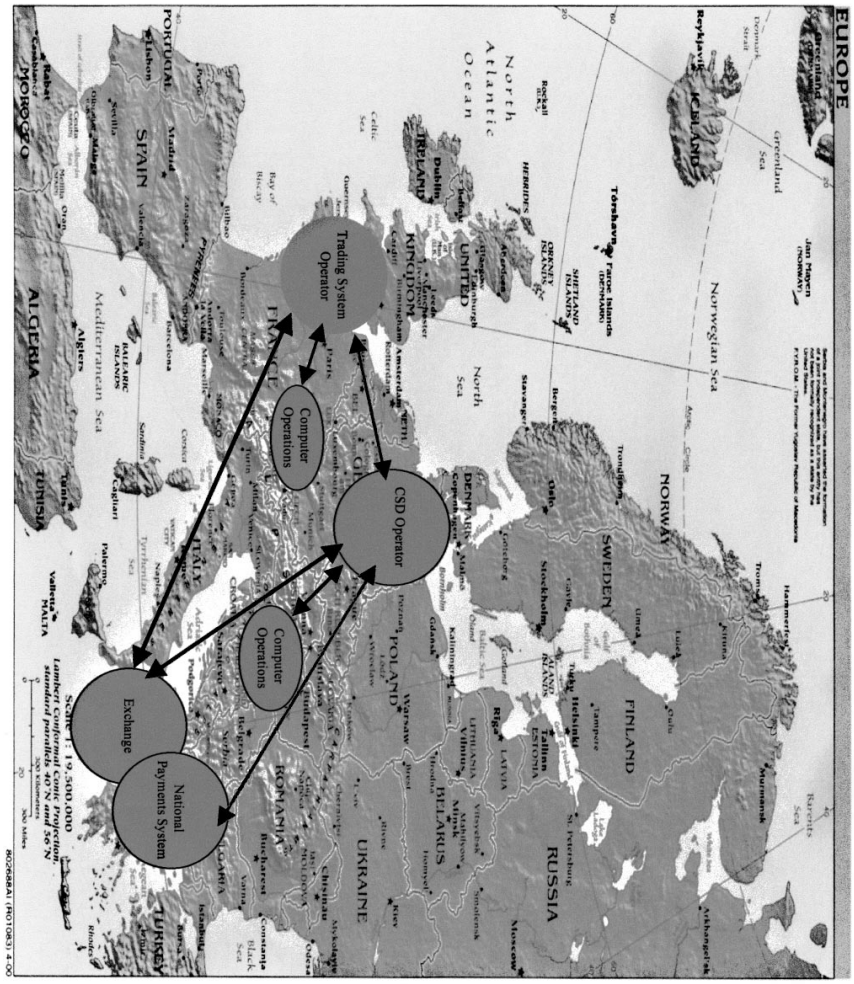

Figure 1

the higher turnover it facilitates should also boost the profitability of the local exchange, helping it to increase investment in trading infrastructure and expansion of its product range (into areas such as index derivatives).

E. Dealing with Illiquidity and Volatility

Shares in most companies listed in developing markets tend to be thinly traded and, therefore, more volatile than shares listed in developed markets. This often gives rise to political concerns, yet the issues are best managed by commercial organizations with a clear incentive to attract investor confidence and participation.

Developing country monopoly exchanges have a tendency to reproduce exchange models used in developed countries with little regard for cost or applicability. For example, periodic call auctions for developing market stocks can mitigate the problems associated with illiquidity, but very few developing country exchanges use them. Call auctions concentrate orders for matching at discrete points in time – typically, one to three times a day. All matched orders change hands at the same price (that is, there is no bid–ask spread) – a feature which is apt to bring credibility to the market in countries where the public is accustomed to 'insiders' routinely getting a better deal in commercial transactions.

When I asked the head of trading at one such exchange why they were using an internally designed continuous trading system rather than a call auction, his response was telling. He first remarked that the large exchanges were using the same sort of system they were, implying that this, in itself, was justification for their decision. He then put a question back to me: 'If we did it your way, what would our brokers do?' The answer, as he realized, is 'virtually nothing' (except underwrite the investor's credit risk), which is precisely the reason why developing country exchanges are better off operating as demutualized commercial organizations. Brokers are not necessary in simple call auctions, which is why broker-controlled exchanges rarely use them.

One young exchange that did begin with a call-auction based market is the Warsaw Stock Exchange. (Re-)established in 1991, the exchange began trading with only one call auction per stock per week. It only moved to a daily call auction in 1994, after sufficient trading volumes had been established. And continuous trading for the most liquid stocks was not added until 1996. As of the start of 2001, 102 of the 225 stocks listed (45%) are traded continuously, with opening and closing calls; 34 (15%) trade in an opening and closing call; and 89 (40%) trade only in an opening call. Half of the exchange's trading volume (in money terms) is still accounted for by the call auctions, indicating their clear attractiveness to Polish equity investors. Warsaw uses the state-of-the-art Paris Bourse NSC continuous trading system, indicating that the success

of the call auctions would be difficult to interpret as a failure of the continuous trading infrastructure. Two-thirds of the exchange's market capitalization is owned by Polish investors, which is also a sign of success for a developing market exchange that is open to foreign investors.

F. Designation and Regulation of Exchange Functions

In developed countries, exchanges typically perform functions wholly unrelated to the actual trading of securities and, indeed, are frequently required by national law to perform such functions. The most significant one is 'listing' the company shares to be traded on the exchange.

Listing is fundamentally a quality control function, designed to ensure that companies admitted to a given segment of the market (e.g. large cap or small cap) meet disclosure requirements appropriate to their size and age. Its role in the equity markets is comparable to that of 'ratings' in the bond market, even if the mechanisms of being listed and rated are very different. However, just as bond rating agencies have a strong incentive to rate bonds more accurately than their competitors, listing agencies should have strong incentives to set listing requirements for publicly traded companies neither too low nor too high. If disclosure requirements are excessive for the size and age of the companies wishing to be publicly traded, then the agency will unnecessarily sacrifice listing revenues. If they are set too low, though, investors are more likely to be harmed by unexpected events, like profit warnings. Investors will therefore shun such stocks, and the agency's reputation and pricing power in the listings market will suffer.

It is an unfortunate historical legacy, however, that, in much of the world, governments have treated listing as a self-regulatory function to be performed by the monopoly national exchange. As a matter of logic and history, however, listing should never have been considered an obligation that needed to be imposed on exchanges. The board of the NYSE began imposing formal listing standards in 1856, and did so wholly of its own accord and in consideration of its own interests. The main reasons for the development of such standards would appear to have been the protection of members trading on their own account and the incentive to listing provided to companies from the public signal of financial soundness and stability (Banner 1998). This incentive is reflected in the fact that exchanges typically extract a significant proportion of their annual revenues from listing activities (36% on the NYSE in 1999).

Whereas listing is clearly a valuable market function, it is important to recognize that there is no logical reason why trading system operators should necessarily be the ones to carry it out. It could just as easily be performed by accounting firms or rating agencies, and done on a competitive basis.

Competition for listing standards should help both to drive down listing costs and to discover the optimal listing standards for companies with different characteristics.

Any assumption that listing standards will always be set too low if established on a purely commercial basis is clearly faulty. A recent example illustrating this comes from Germany's Neuer Markt, a small cap market operated by Deutsche Börse. Having concluded that a 70% year-on-year decline in its listed share prices needed to be at least partially ascribed to a lack of investor confidence in company disclosure – following a string of profit warnings, insider dealing investigations, and insolvencies – the exchange implemented new rules to mandate more comprehensive and standardized company reports and revelation of directors' share dealings. Offenders were made subject to new punitive actions and publication of their offences on the internet. These actions were taken wholly on the basis of the exchange's evaluation of its commercial self-interest.

The implications for developing country equity markets are clear: listing should be a competitive business, fully open to non-exchanges. Exchanges should be permitted to trade any stock listed in the country, whether or not they are the listing agency for that stock. The government may wish to establish minimum base standards for companies to be publicly traded in the country (as in the USA and UK), but these standards should be kept at a low and general level so as to encourage private sector competition for the establishment of quality standards (which are inherently unknowable in advance). Once again, there is no reason why foreign firms should not be allowed to compete for local listing business. If they are successful, this will mean that local investors have confidence in their standards, and are therefore more willing to invest locally than if the standards were less rigorously set.

G. Post-trade Systems

Exchanges require settlement systems to be linked to central bank payments systems. There are different ownership models for CSDs around the world. The most fundamental distinctions are whether the CSD is owned by an exchange or is self-standing, and whether self-standing CSDs are private or government-owned organizations.

In the euro zone, a process of CSD consolidation has just begun which is having the effect of expanding cross-border private CSD activities. The merger of Cedel and Deutsche Börse Clearing to create Clearstream was the first such major event. Given the enormous economies of scale and network externalities in CSD operation, it is important for developing country governments and exchanges to consider how these can be exploited. This requires

that they do not reflexively rely on CSDs built or owned by trading system operators, whether domestic or foreign, but rather that they actively seek out cost-minimizing combinations of compatible trading and settlement systems. Vertically integrated structures for trading, clearing, and settlement have been popular among European exchanges, but are increasingly being called into question now that regional consolidation is accepted as a business imperative. Perceived benefits from building proprietary interlocking trading and post-trade systems must be weighed against potential costs in rapid obsolescence and inflexibility.

CSDs may, for the foreseeable future, have to be linked to the central bank-controlled national payment system (the development of commercial bank money may obviate this need), but this does not require that they be domestically owned or operated. Furthermore, the technical regulations applied to CSD operations can have a significant impact on the efficiency of their operations. It is, therefore, important that governments not import such regulations from abroad without regard for whether they have been optimally adapted to the cross-border electronic trading environment that is currently emerging. For example, the long-standing requirement for central registration of individual investor accounts within the national CSD has hampered the efforts of the Scandinavian exchanges and CSDs fully to integrate their markets and to reduce cross-border trading costs among them. Such rules were implemented well before the advent of electronic trading, but now represent a barrier to the development of more efficient cross-border private sector solutions.

V. A Blueprint for Developing a Modern Securities Trading Infrastructure

For developing countries with no exchange or poorly functioning ones, the base requirements for fostering securitized investment are political stability, monetary stability, and enforceable and transferable property rights. If these are not well established, governments should not devote scarce public resources to exchange-building. Dormant or, much worse, corrupt securities markets are a poor symbol of a government's commitment to the development of a market economy.

In economies which have developed to the point where basic commercial banking activities are widespread, however, there is much that governments can and should do to put fledgling exchange operations on the global efficient frontier.

A. Corporate Disclosure and Governance

The ability to trade shares cheaply and efficiently will mean little if the companies issuing the shares are not subject to some base level of enforceable

standards for disclosure and governance. There are significant differences among developed market accounting and corporate governance standards, and it is beyond the scope of this paper to attempt to identify the components of an optimal regime. Fortunately, it is not critical to do so. The choice between International Accounting Standards (IAS) or US Generally Accepted Accounting Principles (GAAP), for example, will hardly be determinant in the drive to create a successful local equity culture, but the ability to enforce disclosure according to some base 'adequate' standard (for example, as defined by the International Finance Corporation) is very likely to be. Levine and Zervos (1998) found that countries with at least 'adequate' accounting standards had a higher level of stock market development than those which did not, but that moving from adequate standards to IAS did not correlate with a further increase in market development. The same held for investor protection laws. Whereas regulatory fragmentation can itself represent a significant cost of doing business across borders, however, governments should craft regulations with an eye to maintaining compatibility with EU and US standards.

B. Privatization Programme

The privatization of state enterprises is a powerful tool for assisting the growth of securitized finance. Distributing shares widely throughout the populace is the most rapid means of creating public companies, enfranchising citizens in the development of the economy, and kick-starting fledgling exchanges.

C. Functional Regulation and Competition

Governments should establish a legal and regulatory structure for exchange operations which is based on the *functions* to be carried out in the market, rather than on the *institution* of an exchange as such. This will allow companies to offer trading, listing, CSD, or other ancillary services, but not require them to be offered together by the same institution. It will also allow companies to compete to provide any or all of these services. As the trading system and CSD businesses feature powerful network externalities, such competition may be *potential* rather than actual, but it should still be effective. Despite growing concern among European exchanges and regulators over ECNs and trading fragmentation, European share trading is actually more concentrated than it has been at any time over the past fifteen years (since the launch of London's SEAQ International). Yet the very *threat* of new competitors, combined with cross-border mergers and takeovers, has spurred an unprecedented efficiency drive across the continent.

To ensure that potential competition is real rather than just a legal fiction, the authorities should seriously consider barring a trading system operator from owning a controlling stake in a CSD. A dominant trading system operator can use ownership of the CSD to prevent potential competitors from gaining access to it, and, thereby, effectively block them from trading the same securities. It is highly unlikely that Tradepoint (now virt-x) could ever have been launched in the UK had the London Stock Exchange owned Crest, the UK CSD.[12] The announcement by Deutsche Börse of its desire to buy the half of the Clearstream CSD which it does not currently own has thrust this issue to the forefront of EU market policy debate. It is important to recognize that the issue of CSD control is not a theoretical one for developing countries: it is, in fact, at the root of an ongoing dispute between two Nigerian exchanges.

D. Encouraging Foreign Participation

The world already has far more functionally identical trading systems and CSDs than it needs. A government that does not actively attempt to exploit this overcapacity in fostering the growth of a local equity market is doing a great disservice to its citizens and its domestic enterprises. If the cost of investing in the local market is not competitive internationally, local individual savers and collective investment schemes will invest in shares traded in more efficient markets. Foreign trading system and CSD operators should, therefore, be actively encouraged to provide services locally, whether in collaboration with local institutions or on their own. Economies of scale and network externalities in trading system operation, combined with strong commercial incentives for major market system operators continuously to modernize their platforms, should make foreign outsourcing a highly efficient alternative to local systems development. If foreign interest is not forthcoming, therefore, it is imperative for the local authorities to identify any impediments to foreign participation and their options for mitigating them.

E. Technological Infrastructure and Public Investment

A modern telecommunications infrastructure is important for taking full advantage of the latest trading and settlement technology: in particular, to

[12]The Bank of England may have obliged the LSE to ensure fair access to Taurus, the LSE's stillborn predecessor to Crest, but it is difficult to speculate on how effective such regulatory intervention might have been.

eliminate distance costs and facilitate the widest possible network of direct market participants. Public financing of such communications infrastructure, or parts of it, may be necessary to attract foreign investment into the establishment of the trading infrastructure. However, governments should not target public investment into projects which operate as direct subsidies for the proprietary operations of any particular exchange or trading service operator.[13] Such operators have a strong financial interest in pleading for special treatment as a 'national institution', but any such designation is bound to thwart competition and misdirect the allocation of private financial resources. As it is the primary role of securities markets to promote the efficient allocation of financial resources, the institutions comprising such markets need themselves to confront the full exigencies of market forces.

Dr Benn Steil
André Meyer Senior Fellow in International Economics
Council on Foreign Relations
58 East 68th Street
New York, NY 10021
bsteil@cfr.org

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[13]An example of such subsidies is building space. Exchanges are frequently established in palace-like structures at taxpayers' expense, which is no more justifiable economically than handing such facilities to the city sewer operator.

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