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Explaining the Migration of Stocks from Exchanges in Emerging Economies to International Centres

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Abstract

We study the determinants of stock market development and the growing migration of capital raising, listing, and trading activity to international exchanges. Economies with higher income per capita, sounder macro policies, more efficient legal systems with better shareholder protection, and more open financial markets have larger and more liquid markets. As such fundamentals improve, however, the degree of migration to international exchanges also increases. This leads to gains for corporations in the form of lower costs, better terms and more liquidity-traded shares. Fully-fledged local stock exchanges are thus becoming less necessary for many economies. Furthermore, migration can leave too little domestic activity to sustain a local exchange. Therefore, the functions and forms of stock exchanges in many economies need to be rethought.

Keywords: stock exchange development, internationalization, financial markets, trading migration, emerging economies, cross-listing, ADRs, GDRs

JEL classification: G15, G18, G20

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Figures and tables appear at the end of the paper.

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1 Introduction and motivation

Financial markets, and especially stock markets, have grown considerably in developed and developing countries over the last two decades. Better fundamentals (higher economic growth, more macro stability), structural reforms (notably privatization of state-owned enterprises), and specific policy changes (notably domestic financial reform and capital account liberalization) have aided in their growth. Globalization has also advanced in the last two decades with increased cross-border capital flows, tighter links among financial markets, and greater commercial presence of foreign financial firms around the world.

An element of the globalization trend has been the migration of stock exchange activities abroad, particularly in the case of emerging markets. Many firms from emerging economies now cross-list on international exchanges. Depository receipts (DRs), for example, are increasingly popular instruments.[1] In 1999, US$533 billion in DRs were recorded on the New York Stock Exchange (NYSE) alone. And some US$29 billion in new equity was raised through DRs in 2000 through 115 depository receipt offerings in the United States and European markets, a 32 per cent increase over 1999. Trading has also been migrated abroad and local stock exchanges have seen liquidity diminish. Trading in American depository receipts (ADRs) amounted in 2000 to US$1,185 billion or some 17 per cent of trading in corresponding local exchanges.

Advances in technology have further accelerated the globalization trend. In particular, remote access to trading systems is ubiquitous, implying that the services offered by stock exchanges can now easily be accessed from anywhere, including firms having their stocks traded on international exchanges while still being easily accessible to local investors. Given the network properties of stock exchanges, high liquidity further increases the value of additional transactions at exchanges such as New York or London, leading to more concentration of order flow and further increasing liquidity at these exchanges. Migration of trading abroad is putting pressure on many local exchanges, especially in Latin America, but also elsewhere, such as in Central Europe as volumes decline and income from trading activities is reduced.

Going forward, these global trends are likely to accelerate as access to information improves, standards—concerning corporate governance, listing and accounting—are further harmonized, technology further advances and intermarket linkages increase. These trends are raising questions on the emphasis countries need to place on developing their own stock exchange as the means to assure efficient resource

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[1] There are different alternatives to cross-list domestic stocks in international financial markets. A traditional way is to cross-list the share at another exchange. European companies use this method of internationalization most often. A very popular way to internationalize among emerging markets' firms during the 1990s is through depositary receipts, called American depository receipts (ADRs) or global depository receipts (GDRs). These are foreign currency-denominated derivative instruments, issued by international banks like the Bank of New York or Citibank, representing home securities held with a local custodian. DR programmes grow or shrink depending on demand, since the issuance of DRs and the conversion back to the underlying shares only involve a small transaction cost. DRs trade in international markets. For example, US dollar-denominated ADRs from Mexican companies trade at the New York Stock Exchange. A more recently introduced mechanism is the global registered share (GRS), used by large multinational firms; see Karolyi (2001) for an analysis of a recent case. Karolyi (1998) and Pulatkonak and Sofianos (1999) provide more details and a complete review of the options to list internationally.

mobilization and allocation for their corporate sectors. To shed light on the costs and benefits of these trends, it is necessary to address a number of related questions. How have stock markets developed around the world and what factors drive their general development? Are the trends of internationalization common across all regions and countries? Which factors affect internationalization in particular? Is the increased migration a function of improved fundamentals or a reflection of corporations fleeing domestic financial systems that are institutionally weak and have a limited investor base? Does the degree of migration depend on the size of the local market?

The answers to these questions require an analysis of the determinants of stock market development across the globe, the causes of internationalization, and the effects on local exchanges. This paper investigates some of these questions by describing and analysing the patterns and determinants in market capitalization and trading domestically for 77 countries between 1975 and 2000. Using individual firm data starting from 1983 on, we aggregate for each country and year individual capitalization, trading, and capital raising figures of all international companies to get different measures of the degree of internationalization. We then analyse the three components of the internationalization process—listing, trading, and capital raising—for a large cross-section of countries, report on the factors driving these components, and compare these factors to those driving stock markets development in general.

We find that there are a (small) number of fundamental factors that affect in a similar way both the development of the local market as well as the degree to which countries participate in international markets. As countries improve their fundamentals, stock exchange activity increases, but so does the share of activity taking place abroad. This suggests that the two are complementing processes: as better fundamentals allow local markets to develop, so will there also be an increased tendency for firms to access global exchanges. But there will be limits of increased local development being associated with an increased share of offshore activity. Migration of a major share of market capitalization and value traded may have adverse consequences for the remaining companies' liquidity (Levine and Schmukler 2001). Large-scale migration may also make it more difficult to sustain a fully fledged local stock exchange, in a narrow sense—to pay for the fixed overhead of maintaining trading, clearing, and settlement systems, among other things—and in a broader sense—to generate enough order flow for local brokers and enough business for local investment banks, accounting firms, and other supporting services.

Policy implications of these findings are that countries will need to continue to improve fundamental factors—such as shareholder protection and the quality of local legal systems—to make these more attractive for any investor to buy shares and thus to make it easier for firms to list in public markets, have their shares properly valued and, trade liquidity. Our results also imply that countries do not face a choice between local and international exchanges: improving fundamentals will lead to more activity, but most of this activity will go abroad as better fundamentals also accelerate the degree of migration.

The implications are that countries will be best off facilitating as much as possible the access of their firms to international exchanges—by removing regulatory barriers and harmonizing standards—to allow them to reap the gains from more liquid exchanges overseas. Moreover, tighter links or even mergers with global exchanges may be

necessary, as not doing so will lead to a sure decline of the local market. This does not necessarily mean that there is no role whatsoever for local exchanges; there may still be a role for a locally provided mechanism that allows firms to come to the market for the first time.

The paper is structured as follows. Section 2 reviews the related literature. Section 3 provides a description of the data and illustrates some of the main trends in stock market development and the degree of internationalization over time and across our sample of countries. Section 4 reports provides the results of the regressions that try to explain the capitalization, listing, capital raising, and trading trends, both domestic and abroad. Section 5 concludes.

2 Review of related literature

We study several aspects of stock market development: market capitalization, listing, degree of new capital raising, and trading value. We study most of these aspects both from the domestic and international side. Some of these aspects of stock market development have been studied in several research strands. We discuss these strands here briefly.

The determinants of financial sector development have become a much-researched area lately.[2] King and Levine (1993), La Porta *et al.* (1998), Rajan and Zingales (1998), Beck *et al.* (2001), Henry (2000a and 2000b), Bekaert, Harvey, and Llundblad (2001), Demirgüç-Kunt and Levine (2001), and a number of others have analysed the legal foundations of financial markets. They have also studied the relation of financial market development with macroeconomic variables, financial reform, and other country factors, and the relations between the development of the various parts of a financial system. The general finding is that financial markets tend to develop as income per capita grows and financial reform progresses. Stock market development specifically has been shown to depend on a good legal system, particularly minority rights that are being enforced. Stock market development also appears to complement the development of other parts of the financial system and be complementary to other forms of finance in affecting growth, both at the aggregate level as well at the individual firm level.

The determinants of stock market capitalization have been analysed for specific groups of countries in some papers. Catalan, Impavido, and Musalem (2000) examine the determinants of stock market development for OECD and some emerging markets, studying 27 countries in total. They find that, apart from macro stability and legal rights, the size of the institutional investor bases positively affects stock market development, and report evidence of a causal times series relation between institutional investors and stock market development. Claessens, Djankov, and Klingebiel (2001) investigate the development of stock markets in a panel of transition economies and highlight the role of privatization for stock market development in this sample of countries. Perotti and van Oijen (2000) also study privatization and find an indirect

[2] See Levine (1997) for an earlier review.

positive relation of a programme of privatization—through political risk reduction—on stock market development in a sample of 31 emerging economies.

Papers have focused less on the factors determining trading behaviour, although the liquidity of the stock market has been found to be a useful predictor of future economic growth (Levine and Zervos 1998). In part this reduced attention on trading may be because there are large differences across otherwise similarly developed countries in the degree to which stocks are traded. Some emerging markets, South Korea and Taiwan, for example, have much higher trading volumes than many developed countries, while trading in other emerging markets is much lower than that in most developed countries. These, presumably institutional-driven differences have made it more difficult to come up with explanatory factors for trading intensity. One of the few cross-country studies on trading is Domowitz, Glen, and Madhavan (2001a). They document the relations between turnover, equity trading costs, and volatility, and investigate the determinants of domestic trading. They show, among other things, that turnover is inversely related to trading costs, providing a possible explanation for the increase in turnover in recent years as direct costs (commissions, fees) have declined. Jain (2001) analyses the effects of different institutional designs for stock exchanges and trading systems—such as tick size, trading mechanism, and order flow rules—on bid-ask spreads, volatility, and trading turnover.

The determinants of (new) domestic offerings at the firm level have been much studied. Pagano, Panetta, and Zingales (1998), for example, provide a recent review and analysis of why companies go public. Subrahmanyam and Titman (1999) extend this literature to a cross-country context by developing a model of the relation between the going public decision and local financial market development. Empirically, Domowitz, Glen, and Madhavan (2001b) study the determinants of aggregate new offerings (domestic and abroad), covering both debt and equity on a cross-country basis. They find that complex and significant intertemporal correlations exist among various financing choices. The level of overall primary market activity across countries is related to the accounting framework, the level of investor protection, and the extent of access to the local market for foreign investors. They also find that privatization influences foreign offerings and domestic bond market development.

The means and motivations for listing abroad have been studied for different groups of firms and countries. Ljungqvist, Jenkinson, and Wilhelm (2000) investigate the costs and benefits of global integration of primary markets associated with the spread of US underwriting methods. They find that the US-style investment banking methods add value to a corporation in the sense of increasing the net amount raised, but that the decision where to list is not related in a significant way to the cost issue. Miller (1996) and Foerster and Karolyi (1999) empirically analyse the importance of broadening the investor base as a motivation for foreign stock listing into the US. Pulatkonak and Sofianos (1999) also study the determinants of listing in the US. They find that time-zone distance from the US, if the country is an emerging market, and the level of trading costs explain a large fraction of the decision to list in New York. Pagano, Roell, and Zechner (1999) and Pagano *et al.* (2001) study the determinants of European firms listing abroad. They find that firms with high growth (potentials) and in high-tech industries are more likely to list in the US, whereas firms that cross-list within Europe do not grow more than a control group. Sarkissan and Schill (2000) study a very large sample of cross-listing in many markets. They find evidence of a

proximity effect, that is, geographical proximity and other affinity factors such as trade links and common language determine cross-listing. Diversification gains seem to matter little as cross-listing is more, not less, common across markets where returns are highly correlated.

The relation between cross-listing and local market development has also been studied. Hargis (2000) shows theoretically how international cross-listings can transform a segmented local equity market with low liquidity and market capitalization to an integrated market with high liquidity and market capitalization, by altering the incentives of companies and individuals to participate in the market. He shows theoretically that the benefits of cross-listings depend on the degree of correlation between the domestic and world equity market and the relative size of the domestic equity market. Moel (2001) studies the role of ADRs in the development of emerging stock markets.

Reese and Weisbach (2000) study the relation between cross-listing and the quality of the corporate governance framework in the home country of the firm. They find that the weaker the framework at home, the more likely firms are to list abroad to attempt to protect the minority rights of shareholders. Listing abroad can thus be a tool for corporations to signal to their investors that they are more willing to protect minority rights as corporate governance rules are stronger abroad. Pagano, Panetta, and Zingales (1998) find similar results for European corporations. Doidge, Karolyi, and Stulz (2001) find evidence that corporate ownership and the agency costs related to dominant controlling shareholders can motivate cross-listings and be important for differences in the valuation of growth opportunities between local and global markets. Miller and Puthenpurackal (2000) find that by raising bonds abroad (in the US), corporations certify to act in the interest of investors and thus lower their borrowing costs and increase shareholders' wealth.

There are also studies on the effects of foreign initial or subsequent offerings at the individual firm level, which are helpful to identify some of the factors motivating firms to list or trade abroad.[3] Foerster and Karolyi (2000) study different forms of global equity offerings and their relations to long-term equity returns. Chaplinksy and Ramchand (2000) show that global offers are effective in expanding demand and reducing the price pressure effects associated with share issuance. Lins, Strickland, and Zenner (2001) show that firms from emerging markets that use DRs or list on the US equity markets see their financing constraints relaxed, in the sense that their sensitivity of new investment to internal cash flow is reduced. Schmukler and Vesperoni (2001a and 2001b) also find that domestic firms that participate in international markets obtain better financing opportunities and extend their debt maturity.

Reese and Weisbach (2000) also study the effects of cross-listing on subsequent equity offerings and find that offerings increase following cross-listing, especially from lower shareholder protection countries. Baker, Nofsinger, and Weaver (1999) show that international cross-listings raise firm visibility, increasing analyst coverage and media attention. This, in turn, may lead to a lower cost of capital, although they do not study

3 For an early review see Karolyi (1998). See also Karolyi and Stulz (2002) for a more general review of the literature on the pricing of assets internationally.

this. Doidge (2001) shows that following listing in the US, foreign firms' ownership becomes less concentrated with reduced family and management control and more public ownership. Changes in ownership concentration may have implications for the degree of trading as the free float is increased with foreign listing.

There are also some firm- and country-specific studies on the effects of trading migrating abroad. Karolyi (2001) studies the effects of different institutional arrangements on trading for the case of DaimlerChrysler, a single global registered share, in Frankfurt and New York. He finds that the structure of the global share facility cannot be credited with improvements in liquidity nor can it be blamed for the flow-back to Frankfurt, suggesting that the gains from cross-listing in terms of trading and price discovery are not obvious.

Lastly, our work relates to the analysis of the determinants, structure, and evolution of trading systems, and possible impacts of changes in trading systems on market capitalization, turnover, and migration. Clayton, Jorgensen, and Kavajecz (1999) find, studying 248 financial exchanges, that the main determinants for exchange formation are the degree of freedom in the country, the size of its economy, the availability of technology and the quality of its legal system. Schmiedel (2001) analyses the technical efficiency of financial exchanges in Europe. He finds statistically significant inefficiencies, to the order of 20-25 per cent, which can be explained, among others, by size. Not meeting a minimum size for efficient provision of trading services, combined with increased cross-border flow of information and capital, may thus be a motivating factor for the migration abroad and the trend towards consolidation of trading systems. Domowitz and Steil (1999) highlight the impact of a reduction in trading costs, as experienced in many markets, on turnover directly, and the much more important indirect effects of a reduction in trading costs on the cost of equity. Steil (2001) analyses the effects of technological advances on securities-trading industries globally, with particular emphasis on the implications for developing countries. These last studies also discuss the global trends towards consolidation in trading systems and associated clearing and settlement systems, in part as responses of increased competition among exchanges.

As evident from this review, there is a wide range of research studies on the development of local capital markets and the internationalization of equity markets. However, as far as we know, there is no study that analyses which factors explain the internationalization of stock exchange activity relative to the development of local exchange activity and the implications of this migration abroad for local exchanges. Furthermore, while it is generally believed that trading is more liquid in international exchanges than in most local exchanges, no cross-country studies exist on the degree and determinants of liquidity of local shares in international markets. We believe that these issues are addressed for the first time in this paper.

3 Data

This section describes the data used in the paper. First, we discuss the data sources. Second, we present summary statistics of the variables under study.

3.1 Data sources

As noted above, we are interested in several aspects of the development of stock exchanges: market capitalization, listing, trading volume, and degree of new capital raising. For all, we are interested in both the domestic and foreign dimension. Getting data and documenting these various trends is not easy, however, especially as we want to be as comprehensive as possible and cover as many countries and as long a times series as possible. While there are several data sources on market capitalization and trading volumes that cover a large number of countries, there is no comprehensive database on the degree of new capital raising domestically. There is even less comprehensive data available on the degree to which securities are being listed and traded abroad and the degree of capital raising in foreign markets. We therefore need to combine a number of sources. The list of countries covered and the groupings by income level are provided in Appendix Table A1, while the data sources are detailed in Appendix Table A2.

On domestic activity, the dollar amounts of market capitalization and value traded on the major domestic stock exchanges come from the International Finance Corporation's (IFC) Emerging Markets Factbook, now named the *Standard & Poor's Emerging Markets Database*. These data have typically been used to measure the importance of stock markets in financial systems around the world, the contribution of stock markets to firm financing, and the relation between stock market development and economic growth. The data cover only the major stock exchange in the country. Also, the data only cover listing and trading on formal, organized public exchanges and ignore any over-the-counter trading and other markets' trading. As such, they underestimate the country's total market activity. The value of new equity issued on the respective local stock exchange is the total value of public offerings and rights issued during the period, excluding stock dividends or bonus shares that do not raise cash. Its source is also the *Standard & Poor's Emerging Markets Database*. The dataset on domestic activity covers the period January 1975-November 2000 for 82 countries, but the maximum number of countries that we analyse is 77 due to data availability on other variables.

On foreign activity, we have data from the Bank of New York, which covers the three major stock exchanges in the US: NYSE, NASDAQ, and AMEX. The base list of companies with DR programmes comes from two Bank of New York sources: the *Complete DR Directory* and a database with the value traded at the ticker level. These two datasets contain the list of current DR programmes and the effective date of each programme. As of March 2001, there were a total of 2,206 listed programmes. The DR Directory includes all currently active programmes, dating back to January 1956, with most of them being initiated after 1980. The resulting database accounts for 1,951 active DR programmes from 1,524 firms in 80 countries. However, these two databases do not include DR programmes that were terminated before March 2001. To account for these programmes, we use an additional database, also provided by the Bank of New York, that lists all terminated DR programmes (650 programmes in total as of 31 January 2001). The set of terminated DR programmes relevant for our study amounts to 214 firms that are added to the list of firms with DR programmes.

In terms of trading abroad, we focus on trading in DRs. One dataset on DR value traded comes also from the Bank of New York and covers the period 1989-November

2000.[4] Companies that, according to Bank of New York, are not shown to be trading are assigned a zero. We also have data on value traded by foreign firms on the London Stock Exchange (LSE) for 45 countries for the period January 1998-November 2000. The values reported by LSE were converted to current US dollars using the average monthly exchange rates as reported in the International Financial Statistics from the International Monetary Fund (IMF). However, given that the time span of the LSE data is much more limited, we focus our analysis on the Bank of New York data on DR trading in New York.[5]

On capital raised abroad, we use a combination of two different datasets. One comes from the Bank of New York, which covers capital raised though depository receipts for the period May 1980-November 2000. It contains 1,178 operations from 864 firms in 54 countries. The other dataset covers all operations of capital raised in international markets by firms and is compiled by Euromoney. This database provides a more comprehensive account of capital raised, because it includes DR programmes and cross-border listings. It reports 8,795 operations from 5,665 firms in 86 countries, covering the period January 1983-April 2001. By combining these two datasets, we create a series on capital raised in foreign markets.[6] Capital raised abroad, as we define it, thus refers to the sum of the amount of new equity financing which is obtained by using a non-domestic instrument, such as a foreign listing or an ADR, and any new equity issue abroad.

The data from the Bank of New York and Euromoney allow us to construct a list of the 'international' companies for each country. These are companies that cross-list, directly or via DRs, or raise capital in international stock markets. We use this variable to study the degree of listing on international exchanges. In fact, this variable is more general, because it also captures capital raising without listing. We do not, however, consider the degree to which foreign investors hold shares traded in local markets as an indication of internationalization of the firm. It would be almost impossible to construct such a series because most countries do not distinguish between local and foreign investors in the domestic market. Similarly, we do not consider to what degree domestic residents hold domestic shares in the international markets.

3.2 Descriptive statistics

Based on the data compiled, we focus on eight variables of interest, three for the development of local stock exchanges and five for the internationalization of stock exchanges. The former are market capitalization over gross domestic product (GDP), value traded domestically over GDP, and value traded over market capitalization (also known as turnover ratio). The latter are market capitalization of international firms

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4 Using these data, we extrapolate the amount traded in December 2000 to obtain an estimate for the value traded abroad during 2000.

5 Since we have only data for trading in ADRs, we cannot study whether differences in forms of internationalization (e.g., cross-listing, ADRs/GDR, versus global shares) matter for the liquidity.

6 The use of both data sets help us, to some extent, cross check the data, obtain missing information, and correct reporting errors.

over total market capitalization (here equal to the domestic market capitalization),[7] value traded abroad over GDP, value traded abroad over value traded domestically, capital raised abroad over GDP, and capital raised abroad over capital raised domestically. In all cases we work with annual data. Stock data are all end-of-year data. We exclude the US and UK markets, as they are the international financial centres on which basis we define a firm's internationalization.

The variable market capitalization of international firms over total market capitalization captures the degree of listing on international stock exchanges. The numerator of this variable is the sum of market capitalization of firms defined as international, according to the criteria described above. The variable value traded abroad over value traded domestically shows the relative importance of international activity. Both an increase in international trading and a decrease in local trading will produce a rise in this variable. To isolate these effects, we also look at another variable, value traded abroad over GDP. The same applies to capital raised.

Tables 1, 2, and 3 provide descriptive statistics on the eight variables for the years 1990 and 2000. We also use three figures to describe the aggregate trends in the data over time and by country groupings. Figure 1 plots market capitalization as a ratio to GDP and domestic value traded as a ratio to GDP and as a ratio to market capitalization. Figures 2 and 3 plot the variables related to the internationalization of stock exchanges. Those figures differentiate trends by groups of countries according to income level.

As is well known, Figure 1 shows that there has been a gradual increase in market capitalization for all three groupings, with an acceleration in the 1990s for the high-income countries. Table 1 shows that, for all countries combined, the ratio of market capitalization to GDP increased from a mean (median) of 31 (18) per cent in 1990 to some 62 (34) per cent in 2000. This increase in market capitalization reflects both generally higher prices for existing stocks as well as increased number of listings. For high-income countries, for example, the average number of companies listed on a domestic exchange in a country increased from 703 in 1990 to 900 in 1999. Taking a longer perspective, the relative increase in market capitalization has been the most pronounced in high-income countries, with a six-fold increase in the average ratio of market capitalization to GDP between 1975 and 2000, from 22 per cent to close to 117 per cent (see Figure 1). In low-income countries, there has been a quadrupling in market capitalization, from 5 per cent to 20 per cent of GDP. In middle-income countries, however, market capitalization did not increase much, only from 37 per cent to 45 per cent of GDP. These countries seem to have lost out in the 1990s, increasing their market capitalization by only 8 percentage points, when stock markets in high-income countries grew by some 75 percentage points (Table 1). Middle-income and low-income countries end up, in 2000, with market capitalization much below that of high-income countries, on average 70 and 100 percentage points respectively less.

Yet these averages hide some differences within the groups. On the basis of the median, for example, middle-income countries saw a doubling in market sizes over the

[7] As total market capitalization we use the market capitalization in the domestic market. This includes shares that are traded domestically and shares that are traded internationally through DRs. It does not capture the market capitalization of companies cross-listed in international stock exchanges (which is difficult to obtain), so our measure is an underestimate of the true total market capitalization.

1990s, while the mean market size only increased by a quarter, as some markets increased very little, if at all. There are also large differences among regions in the size of markets and their growth.[8] Among the emerging markets, East Asian countries have still the largest markets relative to GDP, although growing at a slower pace relative to transition economies and Latin American countries. Transition economies have seen fast growth in market capitalization, but from very low or non-existing bases, and are currently the group with the lowest average market capitalization. Following a period of rapid increase in the late 1980s, Latin American markets continued growing, but their markets are still only one-third (relative to GDP) of those in East Asia. More generally, there are large differences around the world. The country with the highest aggregate stock market capitalization relative to its GDP in our sample in 2000 is Hong Kong, with a stock market capitalization of 383 per cent; the country with the lowest market capitalization is Bangladesh with 2.5 per cent.

Value traded as a ratio to GDP has grown strongly in the high-income group with an almost 20-fold increase over the 1975-2000 period. Growth has been much less pronounced in the middle- and low-income group with only a ten-fold increase. The growth patterns in value traded mimic those in market capitalization as they mainly capture the overall growth of markets (see Figure 1). As before, low-income countries and middle-income countries have much lower ratios of value traded to GDP than high-income countries. There are again large variations between countries, however. Some middle-income countries had very high value traded for some years. For Taiwan in 1988, for example, the ratio of value traded to GDP was 224 per cent. In 2000, value traded in East Asian countries was 87 per cent of GDP, while in Eastern Europe and Latin America it was only about 4 per cent. The relative slow growth of value traded during the 1990s in Latin America might be explained by limited price increases, de-listings, and migration of trading abroad.

The pattern is different, however, when comparing value traded relative to market capitalization. Here the distinction between the three groups is less strong. Nevertheless, high-income countries have generally more liquid markets than middle-income countries and middle-income countries in turn tend to have more liquid exchanges than low-income countries. The mean value traded ratio in 2000 was 86 per cent for high-income countries, 47 per cent for middle-income countries, and 29 per cent for low-income countries (Table 1). For all three groupings, value traded as a fraction of market capitalization has risen, especially in the second half of the 1990s, the fastest for the middle- and high-income countries. Differences between countries remain large, however, with many middle-income countries having higher value traded ratios than high-income countries on average.

Figures 2 and 3 plot a number of internationalization indicators, with some descriptive statistics of the data provided in Tables 2 and 3. Figure 2 and Table 2 display three indicators of the relative importance of internationalization: market capitalization of international firms relative to market capitalization of all firms, value traded abroad relative to GDP, and value traded abroad relative to value traded domestically. Figure 3 and Table 3 provide two other indicators of the degree of internationalization:

8 To save space, we do not report tables or figures with the numbers for different regions or countries. We just highlight some of the interesting results in the text.

capital raised abroad over GDP and capital raised abroad over capital raised domestically. Again, the indicators are split by the three groups of countries.

The plot of the ratio of market capitalization listed abroad to total market capitalization shows clearly how strong the internationalization trend has been over the past few years, especially for middle-income countries. For these economies, the ratio of market capitalization listed abroad to total market capitalization jumped from only a few percentage points in 1989 to about half, with a peak of over 62 per cent in 1999. In low- and high-income countries, the ratio of foreign to total market capitalization rose by a quarter. In 2000, market capitalization of international firms over total market capitalization stood at an average (median) 31 (37) per cent for high-income countries, 55 (62) per cent for middle-income countries, and 27 (14) per cent for low-income countries. With 95.7 per cent in 2000, Israel had the highest ratio of foreign to total market capitalization. Here, too, one can observe considerable regional differences. In 2000, the Eastern Europe region had the highest ratio of market capitalization listed abroad with 49 per cent, followed by East Asia with 37 per cent, and the Latin America region with 33 per cent. Firms listed abroad accounted just for 19 per cent of total market capitalization in Africa.

Of course, the (increasing) market capitalization listed abroad is accounted for by a relatively small number of companies, as larger companies typically list abroad, but the growth in numbers has been large. For middle-income countries, the average number of companies listed abroad increased from 3 in 1990 to 25 in 2000. Low-income countries had on average 18 companies listed abroad in 2000. With more companies listing abroad, high-income countries experienced the highest increase on average in terms of numbers. While on average only 35 companies were trading abroad in 1990, this number increased to 177 in 2000 for the high-income countries.

Similar trends can be observed for the ratio of trading abroad to domestic trading; a pronounced increase for middle-income countries during the 1990s and a slow increase for low-income countries in the last few years. The trading ratio for middle-income countries rose from a few percentage points to some 40 per cent in 2000. At the same time, the average ratio of trading abroad to home rose from 0 to 7 per cent for low-income countries. The high-income country group appears to have had less of a change in trading migrating abroad in the last few years, with the ratio fluctuating between 15 per cent and 20 per cent.[9]

In terms of capital raised abroad, the trends towards internationalization in the last few years are striking as well. For various years between 1989 and 2000, the amount of capital raised abroad exceeded the amount raised domestically for middle-income countries, with a peak in the ratio of 3.7 in 2000. For low-income countries, the ratio

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9 This reflects the two offsetting effects. While, on one hand, trading abroad has increased as a share of GDP, at the same time, trading domestically has increased even more, thus leading to a relative lower share. Of course, the sample of high-income countries includes in part the countries where the listing itself is actually taking place (the US and the UK, although these countries were not used in the subsequent section to explain the determinants of internationalization). The trend in developed countries is also affected by the data availability: while we have good data for the trading in ADRs and GDRs, the main vehicle used for internationalization by low-income and middle-income countries, we do not cover the trading in cross-listed stocks, a vehicle more typically used by high-income countries. As a result, we probably underestimate the internationalization trend for high-income countries.

has been more volatile, but capital raised abroad amounted on average to some 26 per cent of capital raised domestically in 2000. Not surprisingly, since some of the high-income countries are financial centres in their own right, capital raised abroad exceeded the amount of domestic capital raised in high-income countries only in the years 1990, 1991, and 1997.

As a ratio to GDP, the figures for value traded abroad and capital raised abroad for the three groups of countries are similar to those relative to domestic activity. Since internationalization is now adjusted by the size of the economy, rather than by the size of the local stock market, the relative importance appears different, however. In middle-income countries, trading abroad represented only 2 per cent of GDP as trading itself was only a small ratio to GDP, but amounted to 40 per cent of domestic trading in 2000. This is similar to the trends in capital raised abroad, which increased from virtually nil in 1990 to 0.27 per cent of GDP for middle-income countries and to 0.18 per cent of GDP for low-income countries in 2000. High-income countries experienced the highest growth in capital raised abroad, from less than a quarter of a percentage point in 1990 to almost 2 percentage points in 2000.

4 Explaining the trends in stock market development and migration

We try to explain stock market development and the trends towards internationalization, including differences among countries, by investigating the role of country and international factors. We use several groups of explanatory variables. We use the overall level of development of the country, as captured by GDP per capita and size of its economy. For macroeconomic performance, we use the inflation rate. For the quality of the institutional framework, we use the law and order index, as reported by the Country Risk Guide, and the strength of shareholders rights, as reported by La Porta *et al.* (1998) and Pistor *et al.* (2000). For ease of foreign ownership in the stock market, we use the measure of capital account liberalization reported by the IMF[10] and the index of financial liberalization constructed by Kaminsky and Schmukler (2001).[11] Finally, we use a variable related to the trading system in the country, namely trading commissions and trading fees. The explanatory data are described in more detail in Appendix Table A2.

Before presenting the formal regression results, we explore some key relations using scatter plots of the market development and internationalization variables against the most important explanatory variables we use. Figures 4 and 5 show that there is in general a positive relation between the level of development (GDP per capita) and

[10] This measure has some drawbacks as the IMF revised the reporting format for capital account restrictions in 1996 when the IMF started to provide more details on aspects of capital account liberalization. Before 1996, the IMF measure of capital account liberalization is a simply dummy variable. As a consequence, we needed to splice the two series together to create a series of capital account freedom going back. We do this by using the year-by-year dummy measures up to 1995 and then create a single liberalization dummy after 1996 if at least half of the detailed aspects covered by the IMF signaled liberalization.

[11] The Kaminsky and Schmukler (2001) variable covers different aspects of the financial liberalization process, including liberalization of stock markets, the domestic financial system, and the capital account, for 28 countries since 1973.

stock market activity. As expected, higher inflation rates depress stock market activity, although the effect seems to be non-linear. The institutional variable—shareholder protection weighted by the degree of enforcement in the country—relates positively to the level of stock market development, as already documented by others. Trading cost (fees and commissions) has an unclear raw relation with stock market development.

The positive relation between stock market development and GDP per capita also extends to the degree of internationalization scaled by the size of the local market, although the relation is less strong. It is clearer when scaling by GDP (not depicted): more developed countries have more trading and capital raised abroad relative to GDP. The raw relation between inflation rates and the degree of internationalization is unclear. The degree of shareholder protection also appears to have a positive relation with the degree of internationalization, although the relation is not as strong as for stock market development. Finally, trading costs (fees and commissions) have a positive relation with the degree of internationalization, i.e., higher trading costs seem to drive securities market activities offshore, although the sample of countries for which we have trading costs is smaller.

In addition to the variables already mentioned, in some regressions we also used variables that provide other macroeconomic and institutional aspects related to stock market development. These other variables included interest rates differentials, degree of corruption, capital flows in the form of bonds, equities, and foreign direct investment. Most of these variables were close proxies to the variables we did use (such as inflation in the case of interest rate differentials, and the institutional variables) and we obtained similar results. Other variables, such as portfolio flows, were generally positively related with both stock market development and degree of internationalization, but might be endogenous. On the basis of scatter plots, we also eliminated some outliers in both dependent and independent variables.[12] To save space, we do not report these alternative specifications, also as they confirmed the main results reported below.

For our empirical approach, we use fixed and random effects models. Hausman (1978) specification tests indicate that in some cases we cannot reject the hypothesis that the coefficients from the fixed effects and random effects models are different. In other cases, this hypothesis is rejected. Nevertheless, the sign and significance of the coefficients do not vary across model specifications, and in economic terms similar conclusions can be obtained from both estimators. To avoid reporting results from different estimators, and given the already large number of variables and specifications, we report only results from the random effects models. We also estimated cross-section regressions using data for one year and means over time. Since the results are similar to those obtained with random effects models, we also omit reporting the cross-section estimations for the same reasons mentioned above.

Regarding the estimation technique, we use generalized least squares estimates for the variables related to domestic market development (market capitalization and value traded over GDP) with robust standard errors for heteroskedasticity. For the variables capturing the internationalization of stock markets, we estimate random effects tobit

[12] Specifically, we dropped some observations for Argentina, Azerbaijan, Brazil, Croatia, Ghana, Hungary, Peru, Portugal, Ukraine, and Venezuela.

models, calculated with a semi-parametric estimator. The difference in techniques is motivated by the different nature of data on domestic and international activity. We have data on market capitalization and value traded for most countries, otherwise we have missing observations; thus linear estimations can yield consistent and efficient results. For the variables related to the internationalization of stock markets, we have either positive values or observations with zeros. These zeros are informative because they mean the data are censored at that point. Tobit models account for this feature of the data and yield consistent estimates. Random effects models, ordinary or tobit, account for different variances across countries.

Though we have estimated different models, there are some aspects that we have not addressed. There may, for example, exist interrelations between some of the dependent variables (e.g., between trading and capital raising abroad) and time lags (e.g., privatization may stimulate new offerings domestically or enhance credibility leading to increased stock market development and repeated offerings), relationships we did not attempt to capture. Neither did we try to adjust for the possible endogeneity of some variables in this paper, such as between the level of economic development and the size of the stock market, or between the level of trading costs and value traded. We feel comfortable doing so, in part because the results were generally robust to the estimation techniques employed and to the use of alternative specifications, with some of them containing variables less likely to be endogenous. Moreover, we believe that the endogeneity problem is less likely to arise in the cross-section regressions, for which the results were generally similar to the ones reported here. Furthermore, to try to correct for potential endogeneity biases, we have estimated similar regression using instrumental variables. These estimations yielded very similar results to the ones reported in the paper. Still, it might be worth trying to find new instruments to further study potential endogeneity problems.

Regression results are presented in Tables 4, 5, and 6. The tables provide the results for the basic regression with GDP per capita, inflation, and law and order as the only three explanatory variables. The tables also report regression results with some other variables added. Specifically, we added shareholder rights, capital account liberalization dummy, financial liberalization dummy, and trading costs. It should be noted that there is significant correlation between the various institutional variables. We discuss the results in turn.

For market capitalization. The regression results for the ratio of market capitalization to GDP (Table 4) indicate that the general stock market development in our sample of countries and time period is affected by the variables already identified in the literature. In particular, GDP per capita (+) and enforcement of laws (+, although not statistically significant) drive stock market capitalization, while inflation (-) impedes stock market development. In addition, the simple index of shareholder rights and the degree of capital account liberalization and financial liberalization also positively affect stock market development. Interestingly, both the law and order and the shareholder rights index are statistically significant, suggesting it is the combination of strong enforcement and good shareholder rights which helps stock market development. Perhaps surprisingly, trading costs domestically are not statistically significant related with stock market development.

For trading domestically. The regression results for the ratio of domestic value traded to market capitalization (Table 4) indicate that value traded is affected by the same

variables that drive stock market development in general. In particular, GDP per capita positively affects trading. Inflation is not statistically significantly related to trading activity in the basic regression, but is in one of the other regression results. Enforcement of laws is also positively and statistically significant related to value traded. The indexes of shareholder rights and capital account and financial liberalization are not statistically significant related to value traded. Surprisingly also, trading costs do not seem to affect domestic trading in a statistically significant way.

Results improve somewhat when considering the ratio of trading domestically to GDP (Table 4). Here, inflation is generally negatively, and statistically significant, related to trading activity. Also, shareholders rights positively affect trading. But the law and order variable takes on a negative sign, which is sometimes also statistically significant. The liberalization dummies and trading costs variables are again not statistically significant. The fits for the regressions of the trading variables are in general much lower than those for the stock market development regressions, maybe as other institutional differences explain most of a country's stock trading intensity.

For the ratio of market capitalization listed abroad. The regression results for the ratio of market capitalization listed abroad to domestic market capitalization (Table 5) indicate that the degree of internationalization is influenced by some of the same factors that appear to determine general stock market development. In particular, in the basic regression, GDP per capita (+), inflation (-), and enforcement of laws (+, although not statistically significant) also drive the share of market capitalization listed abroad. In addition, the degree of capital account and financial liberalization are positively, and statistically significant, related to the share of market cap listed abroad. Higher trading costs (-) surprisingly do not seem to accelerate internationalization, but rather retard it.

For shares traded abroad. The ratio of value traded abroad to the value traded domestically appears also to increase with the level of economic development (Table 5). Inflation appears to be less of a factor in influencing migration of trading: although still negative, it is not statistically significant in the basic regression. The degree to which laws are being enforced appears to be less of a determining factor for this variable. None of the other institutional variables, except for the degree of financial liberalization, are actually significant.

The results are somewhat better when considering the value of trading abroad relative to the GDP, a variable that does not combine the aspects of the degree trading in general in the country with the value of migration of trading. Here, inflation decreases and shareholder rights increase the relative value of shares traded abroad. Also, greater financial liberalization and higher trading costs lead to more trading abroad. The capital account liberalization is not statistically significant. It may be that by taking trading abroad as a ratio to GDP, this measure is less sensitive to the large institutional differences across countries affecting the degree of domestic trading.

For capital raised abroad. Finally, we find that the degree of capital raised abroad is also a function of the same factors as the other internationalization variables (Table 6): the more developed the economy, the greater the share of capital raised abroad. The other, macro (inflation) and institutional (law and order) variables do not seem to affect the ratio of capital raised abroad relative to the share of capital raised domestically. This is also true for the other institutional variables, except for the

financial liberalization variable which is statistically significant positive. When taking the ratio of capital raised abroad to GDP, and not to domestic capital raised, we find some more statistically significant results. Not only is GDP per capita still statistically significant, but also inflation and law and order become statistically significant in the expected way. Furthermore, the degree of financial as well as capital account liberalization is positively associated with foreign capital raised. These better results may be explained in part by the fact that the ratio of capital raised abroad to GDP is less volatile from year to year than the ratio of capital raised abroad to capital raised domestically.

In general, it seems that the degree of internationalization is affected by the same variables that drive the development of stock markets: higher income levels, more macroeconomic stability, stronger legal systems, and greater financial and capital account liberalization. Since the internationalization regressions typically have the ratio of international to domestic activity as the dependent variable, the results imply that, as countries develop their fundamentals, they will experience an increase in international activity relative to domestic activity, even as domestic activity increases.

5 Conclusions

Powerful trends of internationalization and migration of order flow are putting pressures on stock exchanges around the world. For some exchanges, already more than half of trading and listing have migrated offshore. Although we do not pretend to answer all issues in this paper, partly as we are largely focussing on the aggregate trend in internationalization over time and across countries rather than studying the more micro, individual firm-specific behaviour, the overall trends point towards some strong trends. Our analysis suggests that the process of developing a local stock exchange also increases domestic firms' access to international exchanges. In particular, we show that, while better fundamentals lead to an increase in domestic activity, more and more of this activity will occur abroad as better fundamentals spur the degree of migration in capital raising, listing, and trading to exchanges abroad.

Other analyses we reviewed have shown that this migration has been beneficial in many ways. Corporations have been able to attract more easily funds at lower costs and better terms, and have tapped into wider investor bases. And investors have been able to acquire and sell shares at more liquid exchanges. At the same time, the migration of a major share of market capitalization and value traded abroad has had adverse consequences for the liquidity of the remaining companies' securities.

Migration also makes it more difficult for countries to sustain a fully-fledged local stock exchange. As trading volumes further decrease, financing the fixed overhead of maintaining market oversight, clearing, and settlement systems, among others, and generating enough order flow for local brokers and enough business for local investment banks, accounting firms, and other supporting services will become even harder, especially for smaller emerging markets. The trend towards increased migration will thus make it more difficult for small exchanges to survive (see also Lee and Steil 2002). This is already reflected in the drive for mergers among many developed countries, particularly in Europe. This consolidation of trading systems, spurred in part by technological advances, is not new. It occurred in the US over the

last hundred years: there were close to 200 stock exchanges in the US at the start of the twentieth century, but there are only about half a dozen today.[13] Surprisingly, stock exchanges in emerging economies have not yet participated in this trend, although they are possibly more at risk given their smaller size and worse legal and financial infrastructure. Clearly, however, pressures to do so will increase and, as technology advances, the ability to remotely interlink trading systems to varying degrees will increase.

The future of stock exchanges in many, especially emerging economies, is consequently not obvious. But, this does not mean that firms and investors will not have access to financial services. To the contrary, costs, terms, and liquidity can improve with increased migration to exchanges with better rules and greater transparency. Given the increased remote access to trading systems, neither will domestic investors need to give up their ability to trade stocks, even when they are listed abroad. The policy implication is that countries might be better off not focussing on developing full-fledged local stock exchanges, but rather concentrate on creating the conditions, such as improving shareholder rights and the quality of local legal systems, that allow corporations to issue and trade shares abroad efficiently. This facilitation will also need to involve the harmonization of corporate governance, accounting, listing and other rules with those in international financial centres, and the strengthening of the enforcement of the securities markets in many environments.

In addition, countries, especially those with small markets, should encourage that their local trading systems are linked tightly or merged with global markets. Furthermore, as Steil (2001) highlights, governments should encourage foreign trading systems as well as clearing and settlement operators to provide services locally, whether in collaboration with local institutions or on their own, and if necessary, governments should remove any impediments against foreign participation. Finally, to avoid domestic institutional investors being held captive to an increasingly illiquid and non-transparent local market, portfolio restrictions that require investment in local instruments only should be avoided.

These conclusions should remain tentative, however, in part because we did not explore all possible determinants of the internationalization process. Furthermore, although we used data for the most important financial centres, we do not cover all forms of internationalization of stocks, such as a cross-listing of a Dutch stock in Frankfurt. Importantly, although we used individual firms' data, we studied only the process of internationalization at the aggregate level of a country. We did not investigate what types of firms were more likely to be internationalized; it might well be, for example, that the internationalization process to date has mainly involved larger corporations which already operate internationally going abroad. Casual evidence suggests this to be the case, although there has also been a flurry of new, innovative firms from emerging markets that have been able to secure financing abroad.[14]

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13 We like to thank Ken Kavajecz for bringing this fact to our attention.

14 The most important firm-specific characteristic determining internationalization in terms of capital raising may have been whether or not it involved a privatization. Many of the privatizations in the 1990s of telecommunications and other state-owned enterprises were too large to be floated purely domestically and most involved large international tranches. At the same time, many high-tech firms were able to raise financing in international markets in the years 1998-2000.

Furthermore, ownership structures of firms, the quality of the banking system and other financial markets in the home countries, the size of and importance of the local institutional investors bases, institutional factors like the efficiency and reliability of clearing systems, and the path dependence inherent in the development of any financial markets may be important factors in determining the degree of migration. Furthermore, we did not analyse the implications of the migration for the price discovery process and the liquidity of stocks; possibly, migration leads to greater liquidity, but (more) fragmentation in price discovery.

Our analysis, however, does suggest that stock exchanges in many emerging markets may not have a comparative advantage in offering capital raising, listing and trading services. Issues of the small scale of many local markets, the tendency for liquidity pools to concentrate in a few markets, and the inherent difficulties in emerging markets to establish credible frameworks complicate the development of their stock exchanges. Nevertheless, many medium-sized firms with local informational needs may not be able to go directly overseas. Other evidence suggests that there still is a large degree to which information is discovered and processed in markets with close proximity to the issuer. This may imply a need for some mechanism in each country to bring firms for the first time to a public market. This may not require a stock exchange, however, but rather an active market—in the form of venture capital firms, commercial banks, non-bank financial institutions, and institutional investors with links to international financial centres—for the financing of new and expanding firms. While we shed light on the internationalization side, more research is needed on what constitutes not only the minimum legal, but also institutional setup for such an active first-stage financing industry, and whether or not that includes some form of a local market for public shares.

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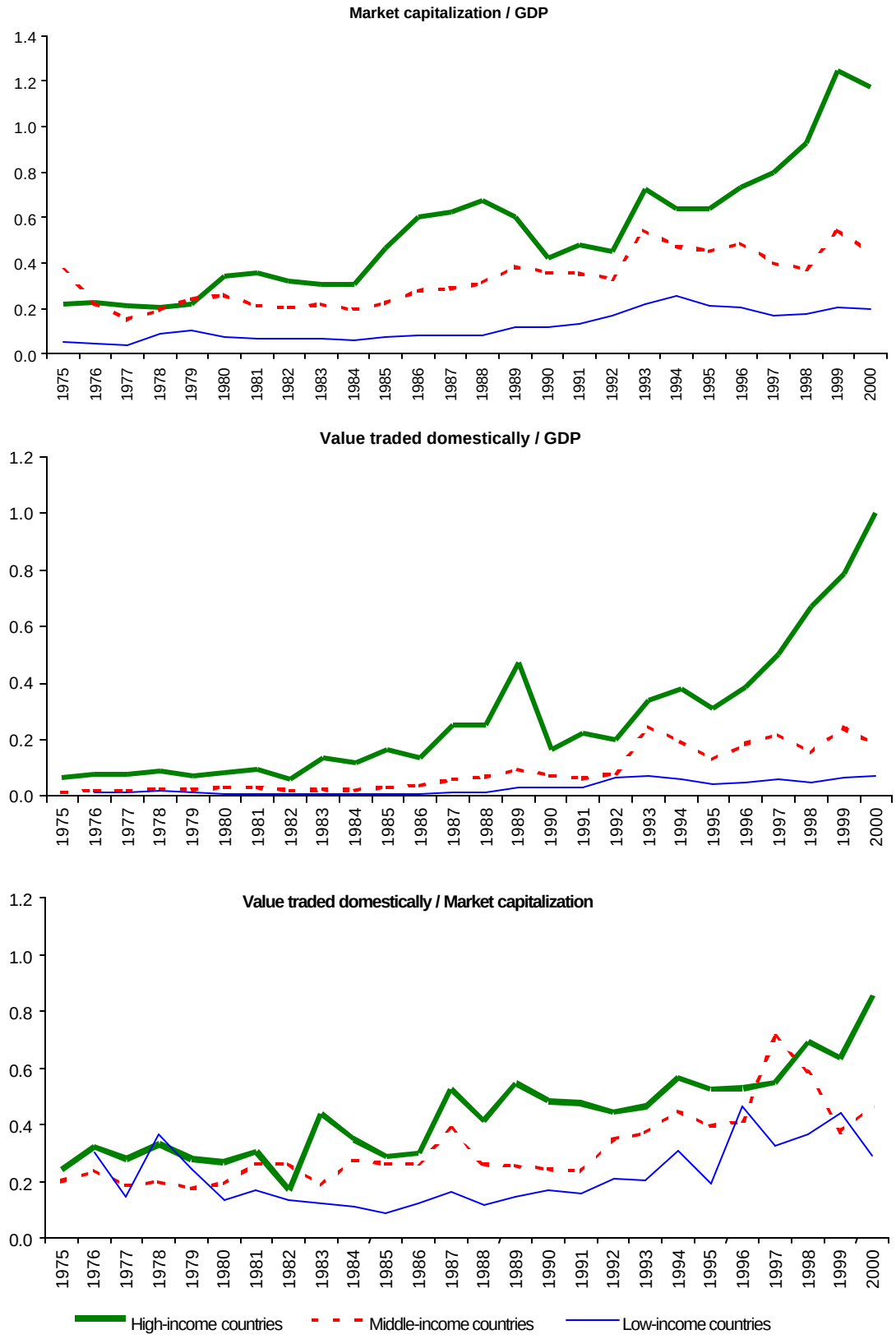
Appendix tables

Figure 1
Stock market development

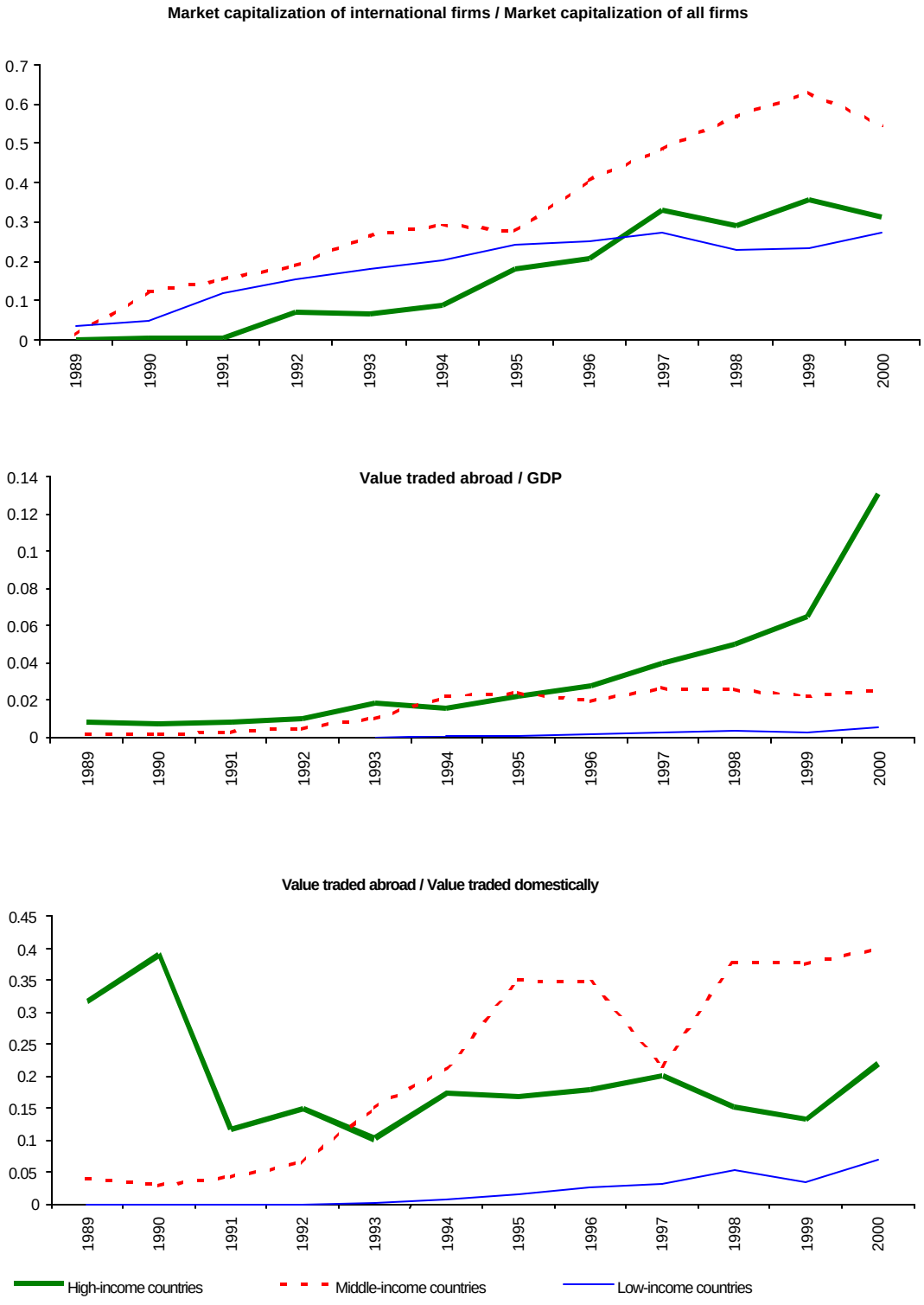
This figure shows the evolution over time of the ratio of market capitalization over GDP and the ratio of value traded domestically over GDP and over market capitalization. The series are aggregated across countries grouped by income level, following the classification of the World Development Indicators, World Bank, see Appendix Table A1.



Source: Standard & Poor's (former IFC) Emerging Markets database.

Figure 2
Internationalization of stock markets, Part A

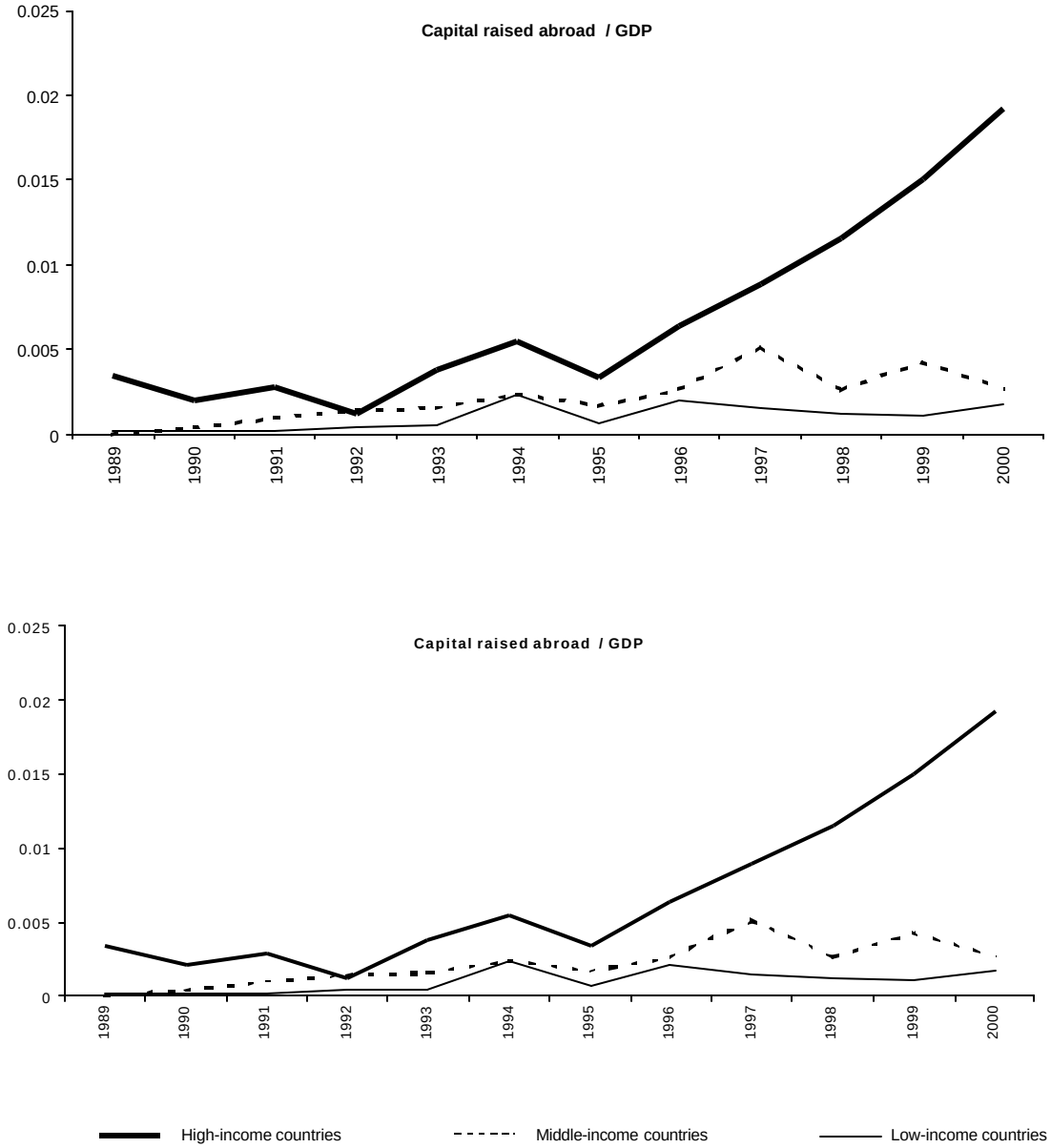
This figure shows the evolution over time of the ratio of market capitalization of firms with international listings over total market capitalization and the ratio of value traded abroad over GDP and over total value traded domestically. The value traded abroad data are computed by aggregating firm-level data from Bank of New York. The series are averages across countries grouped by income level, following the classification of the World Development Indicators, World Bank, see Appendix Table A1.



Source: Bank of New York.

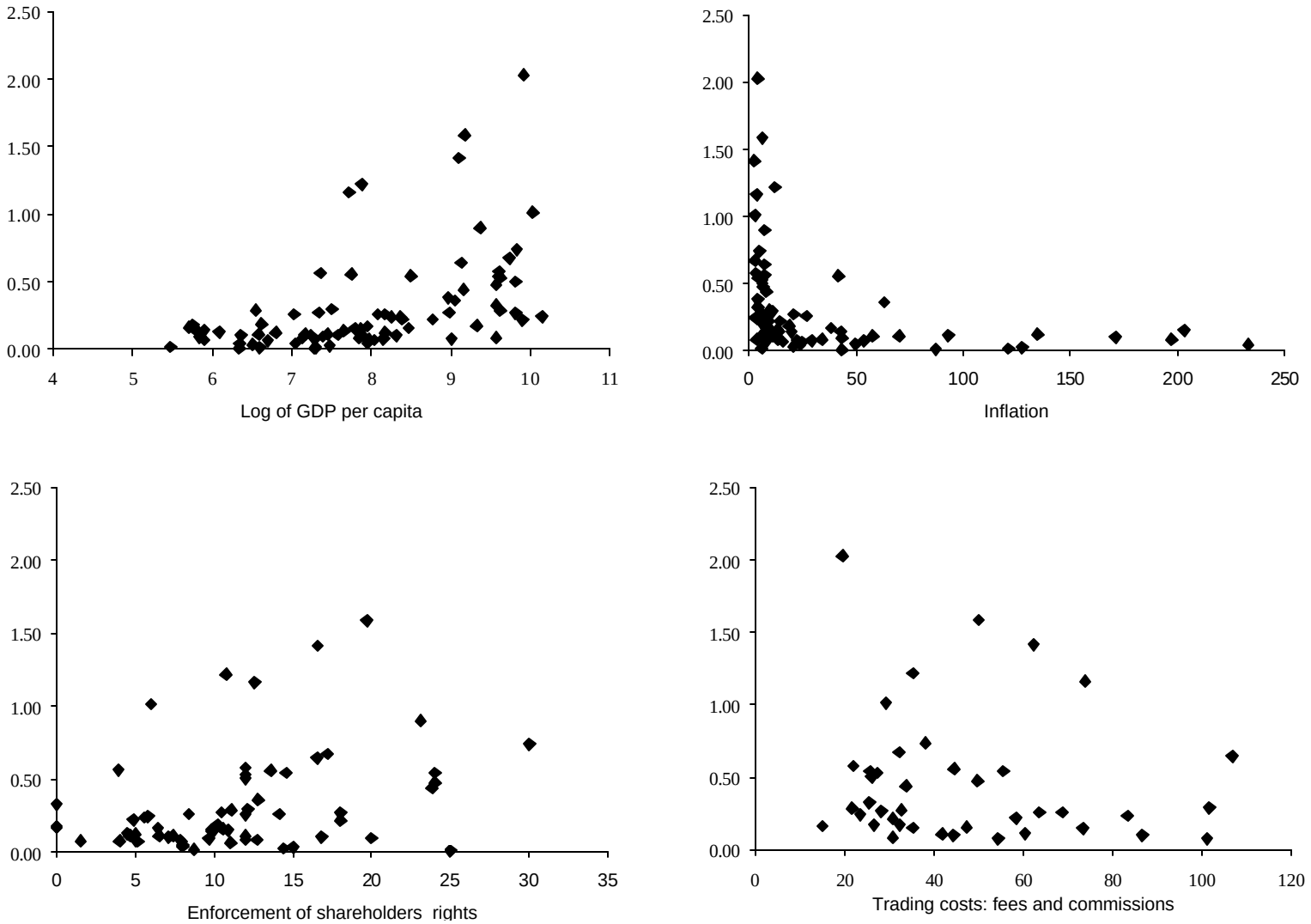
Figure 3
Internationalization of stock markets, Part B

This figure shows the evolution over time of the ratio of capital raised in international markets over GDP and over capital raised domestically. This capital raised in international markets is computed by aggregating firm-level data from Bank of New York and Euromoney. The series are averages across countries grouped by income level, following the classification of the World Development Indicators, World Bank, see Appendix Table A1.



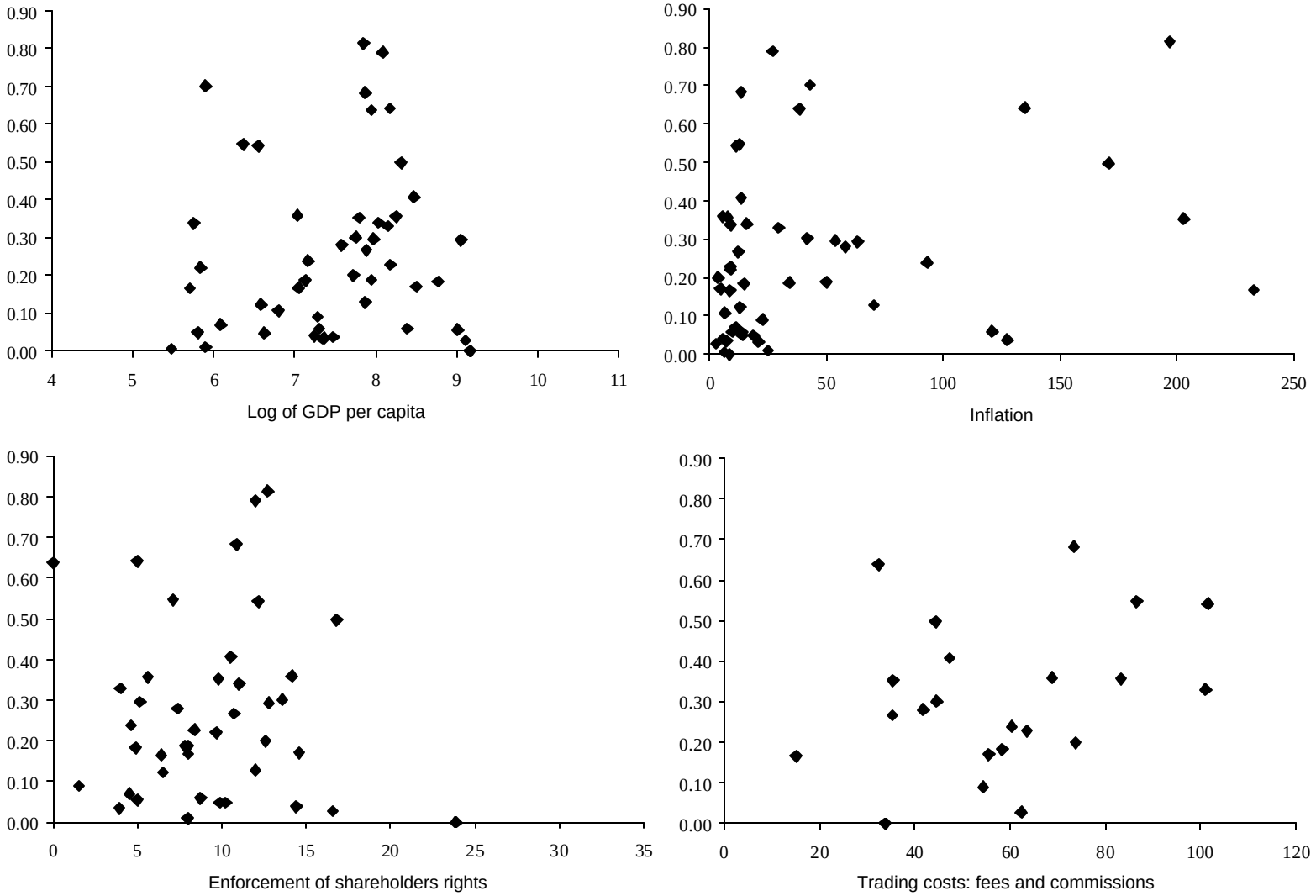
Source: Euromoney and Bank of New York.

Figure 4
Scatter plots: Stock market development



This figure shows the graphs of market capitalization over GDP (in the vertical axis) against log of GDP per capita, inflation (% per year), enforcement of shareholders rights, and trading costs: fees and commissions (in basis points), respectively. The data are averages by country over time, with the available data in the period 1975-2000.
Sources: Standard & Poor's (former IFC) Emerging Markets Database for data on market capitalization in domestic markets; World Development Indicators, World Bank, for GDP, GDP per capita, and inflation; La Porta *et al.* (1998), Pistor *et al.* (2000), and Country Risk Guide for enforcement of shareholders rights; Elkins/McSherry Co., Inc. for trading costs.

Figure 5
Scatter plots: Internationalization of stock markets



This figure shows the graphs of market capitalization of international firms over total market capitalization (in the vertical axis) against log of GDP per capita, inflation (% per year), enforcement of shareholders rights, and trading costs: fees and commissions (in basis points), respectively. These variables are averages by country over time, with the available data in the period 1975-2000.
Sources: As given in Figure 4.

Table 1
Summary statistics: Stock market development

This table shows the summary statistics of the ratio of market capitalization over GDP and the ratio of value traded domestically over GDP and over market capitalization at two points in time. The series are averages across countries grouped by income level, following the classification of the World Development Indicators, World Bank, see Appendix Table A1.

	1990						2000					
	Market capitalization / GDP						Market capitalization / GDP					
	No. obs	Mean	Median	Max	Min	Std dev.	No. obs	Mean	Median	Max	Min	Std dev.
High-income countries	24	0.42	0.31	1.12	0.06	0.32	28	1.17	0.89	3.83	0.14	0.87
Middle-income countries	11	0.36	0.14	1.23	0.02	0.42	18	0.45	0.28	1.64	0.04	0.43
Low-income countries	18	0.12	0.06	0.50	0.01	0.13	30	0.20	0.13	0.70	0.00	0.18
Total	53	0.31	0.18	1.23	0.01	0.32	76	0.62	0.34	3.83	0.00	0.72
	Value traded / GDP						Value traded / GDP					
	No. obs	Mean	Median	Max	Min	Std dev.	No. obs	Mean	Median	Max	Min	Std dev.
High-income countries	23	0.16	0.11	0.55	0.01	0.17	28	1.00	0.66	3.20	0.03	0.94
Middle-income countries	11	0.07	0.04	0.30	0.00	0.10	18	0.18	0.08	0.88	0.01	0.26
Low-income countries	18	0.03	0.00	0.27	0.00	0.07	30	0.07	0.02	0.67	0.00	0.14
Total	52	0.10	0.04	0.55	0.00	0.14	76	0.44	0.09	3.20	0.00	0.73
	Value traded / market capitalization						Value traded / market capitalization					
	No. obs	Mean	Median	Max	Min	Std dev.	No. obs	Mean	Median	Max	Min	Std dev.
High-income countries	23	0.48	0.34	1.67	0.01	0.46	28	0.86	0.75	3.97	0.04	0.77
Middle-income countries	11	0.24	0.26	0.69	0.02	0.19	18	0.47	0.31	2.57	0.03	0.62
Low-income countries	18	0.17	0.06	0.96	0.01	0.25	27	0.29	0.14	1.49	0.02	0.37
Total	52	0.32	0.24	1.67	0.01	0.37	73	0.55	0.38	3.97	0.02	0.66

Source: Standard & Poor's (former IFC) Emerging Markets Database.

Table 2
Summary statistics: Internationalization of stock markets, Part A

This table shows the summary statistics of the ratio of market capitalization of firms with international listings over the total market capitalization and the ratio of value traded abroad over GDP and over total value traded domestically at two points in time. The value traded abroad data are computed by aggregating firm-level data from the Bank of New York. The series are averages across countries grouped by income level, following the classification of the World Development Indicators, World Bank, see Appendix Table A1.

	1990						2000					
	Market capitaliztion of international firms / Total market capitalization						Market capitaliztion of international firms / Total market capitalization					
	No. obs	Mean	Median	Max	Min	Std dev.	No. obs	Mean	Median	Max	Min	Std dev.
High-income countries	1	0.010	0.010	0.010	0.010	.	6.000	0.310	0.370	0.580	0.030	0.220
Middle-income countries	8	0.120	0.030	0.610	0.000	0.210	15.000	0.550	0.620	1.000	0.040	0.260
Low-income countries	9	0.050	0.000	0.290	0.000	0.100	25.000	0.270	0.140	1.930	0.000	0.390
Total	18	0.080	0.000	0.610	0.000	0.160	46.000	0.370	0.330	1.930	0.000	0.350
	Value traded abroad / GDP						Value traded abroad / GDP					
	No. obs	Mean	Median	Max	Min	Std dev.	No. obs	Mean	Median	Max	Min	Std dev.
High-income countries	24	0.007	0.001	0.059	0.000	0.015	26	0.131	0.023	1.443	0.000	0.292
Middle-income countries	18	0.001	0.000	0.020	0.000	0.005	18	0.025	0.003	0.120	0.000	0.038
Low-income countries	32	0.000	0.000	0.000	0.000	0.000	24	0.005	0.000	0.040	0.000	0.012
Total	74	0.003	0.000	0.059	0.000	0.009	68	0.059	0.007	1.443	0.000	0.189
	Value traded abroad / Value traded domestically						Value traded abroad / Value traded domestically					
	No. obs	Mean	Median	Max	Min	Std dev.	No. obs	Mean	Median	Max	Min	Std dev.
High-income countries	21	0.391	0.003	7.464	0.000	1.622	26	0.220	0.033	2.438	0.000	0.510
Middle-income countries	11	0.029	0.000	0.271	0.000	0.082	18	0.398	0.003	2.177	0.000	0.706
Low-income countries	18	0.000	0.000	0.000	0.000	0.000	29	0.069	0.000	1.421	0.000	0.264
Total	50	0.170	0.000	7.464	0.000	1.054	73	0.204	0.009	2.438	0.000	0.502

Source: Bank of New York.

Table 3
Summary statistics: Internationalization of stock markets, Part B

This table shows the summary statistics of the ratio capital raised in international markets over GDP and over capital raised domestically at two points in time. This capital raised in international markets is computed by aggregating firm-level data from Bank of New York and Euromoney. The series are averages across countries grouped by income level, following the classification of the World Development Indicators, World Bank, see Appendix Table A1.

	1990					2000				
	Capital raised abroad / GDP					Capital raised abroad / GDP				
	No. obs	Mean	Median	Max	Min	Std dev.	No. obs	Mean	Median	Max	Min	Std dev.
High-income countries	26	0.0020	0.0007	0.0243	0.0000	0.0048	28	0.0192	0.0134	0.0746	0.0000	0.0190
Middle-income countries	18	0.0004	0.0000	0.0032	0.0000	0.0009	18	0.0027	0.0004	0.0158	0.0000	0.0045
Low-income countries	31	0.0002	0.0000	0.0051	0.0000	0.0009	25	0.0018	0.0000	0.0196	0.0000	0.0046
Total	75	0.0009	0.0000	0.0243	0.0000	0.0030	71	0.0089	0.0020	0.0746	0.0000	0.0149
	Capital raised abroad / Capital raised domestically						Capital raised abroad / Capital raised domestically					
	No. obs	Mean	Median	Max	Min	Std dev.	No. obs	Mean	Median	Max	Min	Std dev.
High-income countries	3	2.30	0.23	6.66	0.00	3.78	2	0.19	0.19	0.37	0.02	0.25
Middle-income countries	6	0.12	0.05	0.47	0.00	0.18	10	3.72	0.49	15.74	0.00	5.91
Low-income countries	7	0.02	0.00	0.12	0.00	0.05	14	0.26	0.00	2.19	0.00	0.62
Total	16	0.49	0.00	6.66	0.00	1.65	26	1.59	0.04	15.74	0.00	3.97

Sources: Euromoney and Bank of New York.

Table 4
Regressions: Stock market development

This table shows regressions estimated through random effects models with robust standard errors for a panel of 77 countries between 1975 and 2000. A constant is estimated but is not reported in the table. Values of t-statistics are in parentheses. *, **, *** mean significance at 10%, 5%, and 1%, respectively.

Independent variables	Market capitalization / GDP					Value traded domestically / Market capitalization					Value traded domestically				
Log of GDP per capita at market prices (US$)	0.208 ***	0.115 ***	0.185 ***	0.296 ***	0.153	0.153 ***	0.081 *	0.179 ***	0.275 ***	0.203 **	0.186 ***	0.086 ***	0.199 ***	0.286 ***	0.249 ***
	(7.490)	(3.160)	(6.424)	(5.334)	(1.620)	(5.647)	(1.932)	(6.481)	(5.197)	(2.187)	(7.710)	(2.845)	(8.494)	(4.607)	(2.941)
Log of inflation	-0.049 ***	-0.064 ***	-0.045 ***	-0.020	-0.038	0.005	-0.038 **	0.003	0.007	-0.031	-0.016 *	-0.068 ***	-0.016 **	-0.011	-0.074 ***
	(5.010)	(4.358)	(4.675)	(1.377)	(1.307)	(0.498)	(2.065)	(0.371)	(0.502)	(0.854)	(1.800)	(4.652)	(2.168)	(0.610)	(2.595)
Law and order	0.013	0.029 *	0.016	-0.013	-0.036	0.023 *	-0.008	0.019	-0.030	-0.240 ***	-0.018	-0.006	-0.017	-0.065 **	-0.231 ***
	(0.867)	(1.669)	(1.114)	(0.518)	(0.592)	(1.645)	(0.390)	(1.457)	(1.171)	(3.499)	(1.348)	(0.327)	(1.487)	(2.003)	(4.019)
Shareholders rights		0.140 ***					0.024					0.062 *			
		(3.205)					(0.491)					(1.823)			
IMF's measure of capital account liberalization			0.084 **					0.025					0.045		
			(2.295)					-0.751					(1.604)		
Financial liberalization dummy				0.124 **					0.033					0.050	
				(2.505)					(0.686)					(0.826)	
Trading costs: fees and commissions					-0.001					0.001					0.001
					(0.430)					(0.345)					(0.368)
No. of observations	1003	468	984	433	151	978	459	964	431	150	993	464	979	435	151
No. of countries	77	64	77	28	41	77	63	77	28	41	77	64	77	28	41
R-squared overall	0.221	0.238	0.231	0.124	0.086	0.061	0.064	0.062	0.047	0.015	0.124	0.177	0.159	0.071	0.075

Sources: Standard & Poor's (former IFC) Emerging Markets Database for data on market capitalization and value traded domestically; World Development Indicators, World Bank, for GDP, GDP per capita, and inflation; La Porta *et al.* (1998) and Pistor *et al.* (2000) for shareholders rights; Elkins/McSherry Co., Inc. for trading costs; Annual Report on Exchange Arrangements and Exchange Restrictions, IMF for dummy on capital account liberalization; Kaminsky and Schmukler (2001) for financial liberalization dummy.

Table 5
Regressions: Internationalization of stock markets, Part A

This table shows regressions estimated through random effects tobit models for a panel of 77 countries between 1975 and 2000. A constant is estimated but is not reported in the table. For the dependent variable market capitalization of international firms over market capitalization of all firms, Nigeria and Zimbabwe were excluded from the regressions, and for variable value traded abroad over GDP, Austria was excluded, both due to collinearity problems. Values of t-statistics are in parentheses. *, **, *** mean significance at 10%, 5%, and 1%, respectively.

Independent variables	Market capitalization of international firms / Total market capitalization					Value traded abroad / Value traded domestically					Value traded abroad / GDP				
Log of GDP per capita at at market prices (US$)	0.106 ***	0.131 ***	0.097 ***	0.131 ***	0.088 ***	0.775 ***	0.203 ***	0.777 ***	-0.128 ***	-0.040	0.066 ***	0.046 ***	0.061 ***	0.028 *	0.005
	(5.659)	(7.838)	(5.612)	(3.956)	(5.715)	(6.226)	(5.265)	(5.872)	(2.942)	(0.791)	(6.119)	(9.388)	(5.417)	(1.648)	(0.688)
Log of inflation	-0.065 ***	-0.095 ***	-0.061 ***	-0.094 ***	-0.025 ***	-0.077	-0.100 ***	-0.072	-0.089 ***	-0.024	-0.007 **	-0.011 ***	-0.006	-0.008	-0.002
	(6.700)	(7.707)	(6.497)	(5.833)	(2.701)	(1.148)	(4.590)	(1.076)	(4.061)	(1.086)	(1.985)	(5.060)	(1.626)	(1.197)	(0.629)
Law and order	0.009	0.024 *	0.018	0.037 **	-0.112 ***	0.039	0.024	0.050	0.167 ***	-0.015	-0.001	-0.002	0.000	0.003	-0.008
	(0.568)	(1.924)	(1.254)	(2.065)	(9.444)	(0.411)	(0.860)	(0.527)	(4.593)	(0.326)	(0.103)	(0.791)	(0.069)	(0.238)	(0.819)
Shareholders rights		0.012					-0.042					0.012 ***			
		(1.019)					(1.398)					(5.727)			
IMF's measure of capital account liberalization			0.093 **					-0.020					0.017		
			(2.325)					(0.091)					(1.286)		
Financial liberalization dummy				0.123 ***					0.301 ***					0.065 ***	
				(2.966)					(3.505)					(2.806)	
Trading costs: fees and commissions					-0.001 **					-0.001					0.000 **
					(2.548)					(0.937)					(2.199)
No. of obs	338	219	333	123	71	732	446	723	277	144	759	456	745	296	141
No. of countries	47	38	47	12	21	75	62	75	25	39	74	61	74	26	38
No. of uncensored obs	305	197	300	112	71	356	244	355	224	118	364	249	361	231	119
No. of left-censored obs	33	22	33	11	0	376	202	368	53	26	395	207	384	65	22
Log-likelihood	-23	14	-21	3	40	-814	-174	-810	-174	-62	255	407	254	148	208

Sources: Standard & Poor's (former IFC) Emerging Markets Database for data on market capitalization; Bank of New York for data on value traded abroad; World Development Indicators, World Bank, for GDP, GDP per capita, and inflation; La Porta *et al.* (1998) and Pistor *et al.* (2000) for shareholders rights; Elkins/McSherry Co., Inc. for trading costs; Annual Report on Exchange Arrangements and Exchange Restrictions, IMF for dummy on capital account liberalization; Kaminsky and Schmukler (2001) for financial liberalization dummy.

Table 6
Regressions: Internationalization of stock markets, Part B

This table shows regressions estimated through random effects tobit models for a panel of 77 countries between 1975 and 2000. A constant is estimated but is not reported in the table. Values of t-statistics are in parentheses. *, **, *** mean significance at 10%, 5%, and 1%, respectively.

Independent variables	Capital raised abroad / capital raised domestically					Capital raised abroad / GDP				
Log of GDP per capita at market prices (US$)	1.263 ***	1.092 ***	1.328 ***	-0.088	0.093	0.005 ***	0.001 **	0.004 ***	0.002 *	0.000
	(2.898)	(2.650)	(3.012)	(0.280)	(0.206)	(5.299)	(2.051)	(4.048)	(1.692)	(0.078)
Log of inflation	0.095	0.211	0.078	-0.004	0.237	-0.001 ***	-0.001 ***	-0.001 **	-0.001 ***	-0.001
	(0.399)	(0.652)	(0.317)	(0.020)	(0.603)	(2.615)	(3.589)	(2.575)	(3.288)	(1.006)
Law and order	0.090	0.144	0.105	-0.401 *	0.488	0.002 ***	0.001 *	0.002 ***	0.000	0.001
	(0.346)	(0.505)	(0.395)	(1.737)	(0.620)	(3.606)	(1.866)	(3.734)	(0.780)	(1.142)
Shareholders rights		0.125					0.000			
		(0.344)					(0.881)			
IMF's measure of capital account liberalization			-0.602					0.003 **		
			(0.830)					(2.243)		
Financial liberalization dummy				0.850 *					0.006 ***	
				(1.699)					(6.092)	
Trading costs: fees and commissions					0.014					0.000
					(0.508)					(0.225)
No. of observations	292	209	283	140	64	1087	483	1062	447	152
No. of countries	43	34	43	14	19	77	64	77	28	41
No. of uncensored observations	186	142	180	110	59	564	346	551	327	143
No. of left-censored observations	106	67	103	30	5	523	137	511	120	9
Log-likelihood	-561	-415	-546	-283	-160	1608	1199	1570	1129	463

Sources: Standard & Poor's (former IFC) Emerging Markets Database for data on market capitalization; Euromoney and Bank of New York for data on capital raised abroad; World Development Indicators, World Bank, for GDP, GDP per capita, and inflation; La Porta *et al.* (1998) and Pistor *et al.* (2000) for shareholders rights; Elkins/McSherry Co., Inc. for trading costs; Annual Report on Exchange Arrangements and Exchange Restrictions, IMF for dummy on capital account liberalization, Kaminsky and Schmukler (2001) for financial liberalization dummy.

Appendix Table A1
List of countries by income level

This table shows the list of countries grouped by income level
following the classification of the World Development Indicators, World Bank

Low-income countries	Middle-income countries	High-income countries
Armenia	Argentina	Australia
Azerbaijan	Botswana	Austria
Bangladesh	Brazil	Belgium
Bulgaria	Chile	Canada
China	Croatia	Denmark
Colombia	Czech Republic	Finland
Côte d'Ivoire	Estonia	France
Ecuador	Hungary	Germany
Egypt	Korea	Greece
Ghana	Malaysia	Hong Kong
India	Mauritius	Ireland
Indonesia	Mexico	Israel
Iran Islamic Republic	Poland	Italy
Jamaica	Saudi Arabia	Japan
Jordan	Slovak Republic	Luxembourg
Kazakhstan	South Africa	Malta
Kenya	Trinidad and Tobago	Netherlands
Kyrgyz Republic	Turkey	New Zealand
Latvia	Venezuela	Norway
Lithuania		Portugal
Macedonia		Singapore
Moldova		Slovenia
Morocco		Spain
Nigeria		Sweden
Pakistan		Switzerland
Peru		Taiwan
Philippines		United Kingdom
Romania		United States
Russia		
Sri Lanka		
Thailand		
Tunisia		
Ukraine		
Uzbekistan		
Zimbabwe		

Appendix Table A2
Series description and data sources

Series name	Description	Source
Capital raised abroad (current US$)	Capital raised in international markets through depository receipts or equity issues. The sample is based on two sources: Euromoney and Bank of New York. The first covers all operations of capital raised in international markets. The second covers capital raised through depository receipts. The series are based on Euromoney's information, augmented by depository receipts operations reported in Bank of New York and not included in Euromoney. The series cover capital raising operations since 1980.	(1
Capital raised domestically (current US$)	Total value of public offerings and rights issues during the period, excluding stock dividends or bonus shares that do not raise cash.	(2
Domestic market capitalization (current US$)	Market capitalization in domestic stock markets.	(2
Domestic market capitalization of international companies (current US$)	Market capitalization of international companies at the end of the year. Series are computed in a firm-level basis, by adding, for each country-year, the market capitalization of all companies with international activity. Companies with international activity are those identified as having at least one active depository receipt program at any time in the year, or having raised capital in international markets in the current or previous years, or trading in London Stock Exchange.	(3
Domestic value traded (current US$)	Value traded in domestic stock market.	(2
Value traded in depository receipts (current US$)	Value traded in depository receipts covering the period 1989-2000. Series are computed in a firm-level basis by adding all tickers belonging to the same company on a yearly basis.	(4
GDP at market prices (current US$)	Gross domestic product (GDP) at purchaser prices. GDP data are converted from domestic currencies using yearly official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used.	(5
GDP per capita at market prices (current US$)	Gross domestic product divided by midyear population.	(5
Inflation, consumer prices (% per year)	Inflation as measured by the consumer price index	(5
Law and order	Qualitative variable that ranges from 1 to 6, where higher numbers indicate higher 'levels' of law and order. Law and order are assessed separately, with each sub-component comprising zero to three points. The law sub-component is an assessment of the strength and impartiality of the legal system, while the order sub-component is an assessment of popular observance of the law. Thus, a country can have a high rating in terms of its judicial system, for example 3, but a low rating, for example 1, if the law is ignored for a political aim, e.g. widespread strikes involving illegal practices. The data cover the period 1984-2000 for all countries, with the exception of Kyrgyz Rep., Macedonia, Mauritius, and Uzbekistan.	(6

Appendix Table 2A continues

Appendix Table A2 (con't)
Series description and data sources

Series name	Description	Source
Shareholders rights	Index aggregating shareholders rights that ranges from 0 to 6. The index is formed by adding 1 when: (1) the country allows shareholders to mail their proxy vote; (2) shareholders are nor required to deposit their shares prior to the General Shareholders' Meeting; (3) cumulative voting is allowed; (4) an oppressed minorities mechanism is in place; (5) the minimum percentage of share capital that entitles shareholders to call for an Extraordinary Shareholders' Meeting is 10 percent or less; (6) shareholders have pre-emptive rights when new shares are issued that can be waived only by a shareholder vote. The data cover the period 1990-1998 for all countries, with the exception of: Bangladesh, Botswana, China, Côte d'Ivoire, Ghana, Iran Islamic Rep., Jamaica, Luxembourg, Malta, Mauritius, Morocco, Saudi Arabia, Trinidad and Tobago, and Tunisia.	(7
Trading costs (basis points)	Trading costs covering fees and commissions, covering the period 1995–98 for 41 countries.	(8
Financial liberalization	Dummy that equals one on and after the year of capital account liberalization, and zero elsewhere. The data cover the period 1975–2000 for 28 countries.	(9
Capital account liberalization	Dummy that equals one on and after the year of capital account liberalization, and zero elsewhere. The data cover the period 1975-95 for all countries.	(10

Sources: (1 Euromoney and Bank of New York;
(2 Standard & Poor's (former IFC) Emerging Markets Database;
(3 WorldScope, Emerging Markets Database, and Bloomberg;
(4 Bank of New York;
(5 World Bank: World Development Indicators;
(6 Political Risk Services: International Country Risk Guide;
(7 Pistor *et al.* (2000); La Porta *et al.* (1998);
(8 Elkins/McSherry Co., Inc.;
(9 Kaminsky and Schmukler (2001);
(10 IMF: Annual Report on Exchange Arrangements and Exchange Restrictions.