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Stock Market Development and Financial Intermediaries

Stylized Facts

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The three most developed stock markets are in Japan, the United Kingdom, and the United States, and the most underdeveloped markets are in Colombia, Nigeria, Venezuela, and Zimbabwe. Markets tend to be more developed in richer countries, but some markets commonly labeled "emerging" (for example, in Malaysia, the Republic of Korea, and Thailand) are systematically more developed than some markets commonly labeled "developed" (for example, in Australia, Canada, and many European countries).

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Summary findings

World stock markets are booming. Between 1982 and 1993, stock market capitalization grew from $2 trillion to $10 trillion, an average 15 percent a year. A disproportionate amount of this growth was in emerging stock markets, which rose from 3 percent of world stock market capitalization to 14 percent in the same period.

Yet there is little empirical evidence about how important stock markets are to long-term economic development. Economists have neither a common concept nor a common measure of stock market development, so we know little about how stock market development affects the rest of the financial system or how corporations finance themselves.

Demirgüç-Kunt and Levine collected and compared many different indicators of stock market development using data on 41 countries from 1986 to 1993. Each indicator has statistical and conceptual shortcomings, so they used different measures of stock market size, liquidity, concentration, and volatility, of institutional development, and of international integration. Their goal: to summarize information about a variety of indicators for stock market development, in order to facilitate research into the links between stock markets, economic development, and corporate financing decisions. They highlight certain important correlations:

- In the 41 countries they studied, there are enormous cross-country differences in the level of stock market development for each indicator. The ratio of market capitalization to GDP, for example, is greater than 1 in five countries and less than 0.10 in five others.
- There are intuitively appealing correlations among indicators. For example, big markets tend to be less volatile, more liquid, and less concentrated in a few stocks. Internationally integrated markets tend to be less volatile. And institutionally developed markets tend to be large and liquid.
- The three most developed markets are in Japan, the United Kingdom, and the United States. The most underdeveloped markets are in Colombia, Nigeria, Venezuela, and Zimbabwe. Malaysia, the Republic of Korea, and Switzerland seem to have highly developed stock markets, whereas Argentina, Greece, Pakistan, and Turkey have underdeveloped markets. Markets tend to be more developed in richer countries, but many markets commonly labeled "emerging" (for example, in Korea, Malaysia, and Thailand) are systematically more developed than markets commonly labeled "developed" (for example, in Australia, Canada, and many European countries).
- Between 1986 and 1993, some markets developed rapidly in size, liquidity, and international integration. Indonesia, Portugal, Turkey, and Venezuela experienced explosive development, for example. Case studies on the reasons for (and economic consequences of) this rapid development could yield valuable insights.
- The level of stock market development is highly correlated with the development of banks, nonbank financial institutions (finance companies, mutual funds, brokerage houses), insurance companies, and private pension funds.

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Stock Market Development and Financial Intermediaries: Stylized Facts

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I. Introduction

World stock markets are booming. Between 1982 and 1993, world stock market capitalization grew from $2 trillion to $10 trillion, which implies an average annual growth rate of 15%. Emerging stock markets composed a disproportionately large amount of this growth, rising from 3 percent to 14 percent of world stock market capitalization. Impressively, emerging market capitalization rose by a factor of 21 over this 11-year period. The global growth of stock markets and the emerging market boom have attracted the attention of academics, practitioners, and policy makers. Many studies focus on measuring the benefits to holding a globally diversified portfolio,[1] and many countries are reforming regulations and laws to foster capital market development and attract foreign portfolio flows.[2] Yet, there exists very little empirical evidence on the importance of stock markets for long-run economic development.[3] At a more basic level, economists have neither a common concept nor a common measure of stock market development. Subsequently we know very little about how stock market development affects the rest of the financial system or how corporations finance themselves.

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[1] For example, see Bosner-Neal, Brauer, and Wheatley (1990), Cho, Eun, and Senbet (1986), Errunza and Losq (1989, 1985a, 1985b) Errunza, Losq, and Padmanabhan (1992), Errunza and Senbet (1981), Gultekin, Gultekin, and Penati (1989), Jorion and Schwartz (1986), Korajczyk and Viallet (1989), Solnik (1974), Stehle (1977), and Wheatley (1988)

[2] Net flows of private portfolio equity investment in developing countries rose about 21 fold from 1982 to 1993, equalling about $13 billion in 1993.

[3] A growing theoretical literature suggests that a well-developed stock market may promote risk diversification, liquidity, information processing, and capital mobilization and that these services may accelerate long-run growth. See, Levine (1991), Greenwood and Smith (1994), Obstfeld (1994).

This paper collects and compares a broad array of stock market development indicators. Specifically, using data on 41 countries from 1986-1993, we examine different measures of stock market size, market liquidity, market concentration, market volatility, institutional development, and international integration. Since each indicator suffers from statistical and conceptual shortcomings, using a variety of indicators should provide a more accurate depiction of stock market development across countries. Furthermore, stock market development - like the level of economic development - is a complex and multi-faceted concept and no single measure will capture all aspects of stock market development. Thus, our goal is to produce a set of stylized facts about stock market development indicators that facilitates and stimulates research into the links between stock markets, economic development and corporate financing decisions.

After describing each of the stock market development indicators, we examine the relationship among the stock market development indicators. We find enormous cross-country variation in the level of stock market development as measured by each indicator. For example, five countries have market capitalization to GDP ratios of greater than one, while five countries have market capitalization to GDP ratios of less than 0.10. We also find attractive correlations among the indicators. For example, large stock markets are more liquid, less volatile, and more internationally integrated than smaller markets; countries with strong information disclosure laws, internationally accepted accounting standards, and unrestricted international capital flows tend to have larger and more liquid markets; countries with markets concentrated in a few stocks tend to have smaller, less liquid, and less internationally integrated markets; and internationally integrated markets are less volatile.

Although many stock market development indicators are significantly correlated in an

intuitively plausible fashion, the individual indicators produce different country rankings. Thus, to produce an assessment of the overall level of "stock market development" across countries, we produce indexes of stock market development that average together the information contained in the individual indicators. We find that the most developed stock markets in the world are Japan, the United States, and Great Britain, while the most underdeveloped markets are Colombia, Venezuela, Nigeria, and Zimbabwe over 1986-1993. The data also suggest that Hong Kong, Singapore, Korea, Switzerland, and Malaysia have highly-developed stock markets, while Turkey, Greece, Argentina, and Pakistan have underdeveloped markets. Furthermore, although richer countries generally have more developed stock markets than poorer countries, many markets labeled "emerging" have more developed markets than France, the Netherlands, Australia, Canada, Sweden, and Norway.

We also use the assortment of stock market indicators to evaluate which stock markets have been developing fastest over the last eight years. Using measures of size, liquidity, and international integration, Indonesia, Turkey, Portugal, and Venezuela stand-out as the most rapidly developing markets in the world. We hope to explore the causes and consequences of these explosive stock market growth experiences in future work.

Besides collecting stock market development indicators and compiling stylized facts about these indicators, we examine the relationship between these stock market development indicators and measures of financial intermediary development. We ask, do countries with well-developed and efficient stock markets also have well-developed and efficient banks and nonbank

financial intermediaries?[4] To shed some light on this question, we document the cross-country relationship between various measures of stock market development and different indicators of financial intermediary development. We find that the level of stock market development is highly correlated with the development and efficient functioning of banks, private nonbanks, and private insurance companies and pension funds.

We hope that by assembling various indicators of stock market and financial intermediary development and by compiling a few stylized facts regarding these indicators, this paper will stimulate research on the relationships among stock markets, financial intermediaries and economic development. We organize the remainder of the paper as follows. Section II describes and presents indicators of stock market development. These include measures of stock market size, liquidity, volatility, concentration, institutional development, and asset pricing efficiency. Section III (a) ranks countries using the different stock market development indicators and (b) studies the correlation among the indicators. Section IV examines which countries have the fastest developing stock markets. Section V analyzes the links between stock market development and financial intermediary development. We use measures of the size of the banking system, the amount of credit going to private firms, the size of nonbank financial corporations, and the size of private insurance and pension companies. Section VI summarizes the results.

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[4] Since debt and equity are frequently viewed as alternative sources of corporate finance, stock markets and banks are sometimes viewed as alternative vehicles for financing corporate investments. Consequently, we thought it would be valuable to document the cross-country ties between stock market development and financial intermediary development.

II. Stock Market Development Indicators

This section presents and discusses an array of stock market development indicators. Specifically, we describe measures of (a) market size, (b) market liquidity, (c) market volatility, (d) market concentration, (e) asset pricing efficiency, (f) regulatory and institutional development, and (g) conglomerate indexes that aggregate the information contained in measures (a)-(f). We use data from the International Finance Corporation's *Emerging Markets Data Base* and the *International Financial Statistics* of the International Monetary Fund. The data cover the 1986-1993 period for 41 countries. Table 1 lists the names of the countries.

A. Stock Market Size

The market capitalization ratio equals the value of listed shares divided by GDP and analysts frequently use the ratio as a measure of stock market size. In the rest of the paper, we refer to this measure as "market capitalization." In terms of economic significance, the assumption behind market capitalization is that market size is positively correlated with the ability to mobilize capital and diversify risk. As indicated in Table 1, South Africa, Hong Kong, Malaysia, Japan, and Singapore all had market capitalization ratios of greater than one over the 1986-1993 period, while Nigeria, Argentina, Indonesia, Colombia, and Turkey all had market capitalization ratios of less than 0.1 over the same period.

We also include statistics on the number of listed companies as an additional measure of market size. While marginal differences in the number of listed companies are uninformative, extreme values can be useful. Specifically, it is not very interesting that Australia averaged 1,184 listed companies and Canada averaged 1,118 listed companies over the 1986-1993 period.

But, the fact that Finland and Zimbabwe had fewer than 70 listed companies suggests that these countries have very limited markets (Table 1). Similarly, the fact that Indonesia, Turkey, and Portugal saw the number of listed companies grow at over 20 percent per year over the 1986-1993 period suggests rapid stock market development (Table 8).

B. Liquidity

While economists advance many theoretical definitions of "liquidity," analysts generally use the term "liquidity" to refer to the ability to easily buy and sell securities. A comprehensive measure of liquidity would quantify all the costs associated with trading, including the time costs and uncertainty of finding a counterpart and settling the trade. Since we want to compare liquidity across countries and since data is very limited, we simply use two measures of realized stock trading.

Total value traded / GDP equals total shares traded on the stock market exchange divided by GDP. The total value traded ratio measures the organized trading of equities as a share of national output and therefore should positively reflect liquidity on an economy-wide basis. Japan, Hong Kong, Malaysia, the United States, and the United Kingdom all have total value traded/GDP ratios above 0.4, while Pakistan, Zimbabwe, Colombia, and Nigeria had total value traded/GDP ratio of about 0.01 over the 1986-1993 period. The total value traded/GDP ratio complements the market capitalization ratio. Although market capitalization may be large, there may be little trading. For example, South Africa and Chile have above average market capitalization but below average total value traded/GDP (Table 1). Together, market capitalization and total value traded/GDP inform us about market size and liquidity.

A second measure of liquidity is the turnover ratio. Turnover equals the value of total shares traded divided by market capitalization. High turnover is often used as an indicator of low transactions costs. Korea and Germany (largely reflecting massive trading around reunification) had turnover ratios above 0.9, while Nigeria, Zimbabwe, and South Africa had turnover ratios below 0.05. The turnover ratio complements market capitalization. A small but active market will have small market capitalization but high turnover. For example, Norway and India had below average market capitalization but above average turnover (Table 1). Alternatively, South Africa's market capitalization to GDP ratio was the highest in the world while its turnover ratio was one of the smallest.

Turnover also complements total value traded/GDP. While total value traded /GDP captures trading compared with the size of the economy, turnover measures trading relative to the size of the stock market. Put differently, a small, liquid market will have a high turnover ratio but a small total value traded/GDP ratio. For example, there was not much equity trading in Brazil relative to the size of its economy, but Brazil's turnover ratio was high, reflecting a small but active stock market. Alternatively, Malaysia had the third highest market capitalization and total value traded/GDP ratios over the 1986-1993 period but had below average turnover (Table 1). Thus, incorporating information on market capitalization, total value traded/GDP, and turnover provides a more comprehensive picture of development than the information provided by any single indicator.

C. Volatility

We include a measure of stock market volatility, VOLATILITY. This indicator is a twelve-month rolling standard deviation estimate based on market returns. We cleanse the return series of monthly means and twelve months of autocorrelations using a procedure defined by Schwert (1989). We include this measure because of the intense interest in market volatility by the profession and practitioners. Although greater volatility is not necessarily a sign of more or less stock market development, we sometimes refer to "less volatility" as reflecting "greater stock market development" for simplicity. As with the other indicators, there are great cross-country differences in volatility. Whereas volatility in Pakistan, the United States, and the Netherlands averaged about 0.03 over the 1986-1993 period, volatility in Brazil and Argentina was above 0.25.

D. Concentration

In some countries a few companies dominate the market. To measure the degree of market concentration, we compute the share of market capitalization accounted for by the ten largest stocks and call this measure Concentration. The United States and Japan have very low concentration. The largest 10 stocks account for less than 20 percent of the markets. In contrast, concentration is three times larger in Venezuela, Argentina, and Colombia, where the concentration ratio averaged above 0.60 from 1986-1993 (Table 2).

E. Asset Pricing

Academic researchers and market practitioners have devoted prodigious resources to measuring the degree of integration between national stock markets and gauging whether markets price risk efficiently. Analysts generally refer to countries that are more integrated into world capital markets and price risk more efficiently as "more developed."

To measure asset pricing efficiency, we use estimates of asset mis-pricing computed by Robert Korajczyk (1994). Unfortunately, the data only permit computation of these asset pricing efficiency measures for 24 countries. As argued in Korajczyk and Viallet (1990, p. 555-557), the capital asset pricing model and arbitrage pricing model imply that the expected return on each asset is linearly related to a benchmark portfolio or linear combination of benchmark portfolios. In domestic versions of these asset pricing models the benchmark portfolios include only securities traded on the local exchange, while the international versions include all securities. If the models are correct, then the benchmark portfolio or combination of portfolios, should explain all of the systematic expected returns on assets above the risk-free interest rate.[5] Thus, we term systematic deviations of expected returns as "risk mis-pricing" under the maintained hypothesis that the model is correct. Using different asset pricing models, Korajczyk (1994) computes the systematic deviation between actual returns and those implied by the models.

The APT and ICAPM are computed using an international arbitrage pricing model and international capital asset pricing model, respectively. Korajczyk (1994) computes the degree of risk mis-pricing between domestic stocks and the prices of risk in world capital markets using

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[5]Since no asset is riskless in real terms, Korajczyk and Viallet (1990) also test the restrictions implied by a zero-beta asset.

these two models. These risk mis-pricing indicators measure capital market integration; with no arbitrage, the price of risk should be equalized across national borders. Greater mis-pricing may reflect poor information about firms, high transactions costs, and official barriers to international asset trading. We refer to greater mis-pricing as indicating less stock market development. The APT and ICAPM mis-pricing indicators give similar country rankings. Brazil, Turkey, Mexico have relatively large mis-pricing values, while the United States, Japan. Jordan, and Pakistan yield mis-pricing estimates that suggest a high level of international integration.

CAPM measures domestic market risk mis-pricing. Korajczyk (1994) fits a domestic-CAPM model to compute the degree of risk mis-pricing across stocks within the country. This indicator measures the efficiency of domestic risk pricing compared with a benchmark portfolio of domestic stocks. One shortcoming with this measure is that as a country becomes more integrated internationally, the relevant benchmark portfolio shifts away from being a benchmark of domestic assets. The relevant benchmark becomes more "internationalized." Thus, domestic risk mis-pricing as measured by CAPM may rise even as the stock market becomes more integrated and efficient. We include this measure for completeness but focus on the results using the international benchmark portfolios.

These three mis-pricing indicators rely on the success of equilibrium models of asset pricing that investigators sometimes rejected as good representations of the pricing of risk. However, these measures allow us to incorporate indicators, albeit imperfect indicators, of the ability of agents to diversify risk domestically and internationally. Furthermore, we analyze the evolution of the degree of integration between each domestic market and the world market over time.

F. Regulatory and Institutional Indicators

Regulatory and institutional factors may influence the functioning of stock markets. For example, mandatory disclosure of reliable information about firms and financial intermediaries may enhance investor participation in equity markets. Regulations that instill investor confidence in brokers and other capital market intermediaries should encourage investment through and trading in the stock market.

To measure regulatory and institutional features of emerging stock markets, we use indicators constructed by the International Finance Corporation (IFC). Specifically, we use seven regulatory-institutional indicators. The first indicator shows whether the firms listed in a stock market publish price-earnings information. The IFC gives a value of 0 or 1, where 1 indicates the information is comprehensive and published internationally. The second indicator measures accounting standards. The IFC assigns values of 0, 1, or 2, for countries with poor, adequate, or good (internationally accepted) accounting standards. The third indicator measures the quality of investor protection laws as judged by the IFC. where 0, 1, and 2 are used to indicate poor, adequate, or good investor protection laws. The fourth indicator shows whether the country has a securities and exchange commission or not. The fifth, sixth, and seventh indicator measure restrictions on dividend repatriation by foreign investors, capital repatriation by foreign investor, and domestic investments by foreigners. The IFC assigns values of 0, 1, and 2, indicating whether capitals flows are restricted, have some restrictions, or are free, respectively. We also compute an average institutional indicator which simply averages the seven regulatory-institutional indicators. These indicators are available on an annual basis from 1986-1993 for twenty developing countries.

Table 3 summarizes the institutional and regulatory indicators. There is substantial variation across countries and indicators. For example, Jordan freely allows international capital flows cross its borders, but does not publish regular price-earnings information and has poor accounting standards. India has accounting standards of internationally accepted quality, but restricts capital inflows and the repatriation of capital and dividends. Nigeria tightly restricted capital flows over most of the period and did not publish price-earnings on firms in a comprehensive and internationally accepted manner. In contrast, Malaysia, Mexico, Korea, Brazil, and Chile have very high institutional indicators.

G. Correlations and Rank Correlations Among the Stock Market Development Indicators

Table 4 provides the correlations among many stock market development indicators, and Table 5 provides the rank correlations. The first number is the correlation, the second number is the P-value (a value of less than 0.05 indicates the correlation is significant at the 0.05 level), and the third number gives the number of observations used in computing the correlation. When we have 25 or fewer observations, we term a P-value of less than 0.10 as "significant." When we have more than 25 observations, "significant" refers to P-values of less than 0.05.

Since the correlation and rank correlation are very similar, we simply refer to the correlations in Table 4 and make six points. First, while the two measures of market liquidity, total value traded/GDP and turnover, are significantly positively correlated, the correlation coefficient is only 0.50. Thus, while the degree of trading relative to the size of the economy is significantly correlated with the degree of trading relative to the size of the market, the two

liquidity measures do not move one for one. Total value traded/GDP and turnover provide complementary information about stock market liquidity as discussed above.

Second, market size is significantly positively correlated with total value traded/GDP and the average institutional indicator and significantly negatively correlated with risk mis-pricing and volatility. Countries with big stock markets have less volatile, more efficient stock markets with a high volume of trading relative to GDP.

Third, countries with highly concentrated markets also have markets that are underdeveloped using the other indicators. Specifically, market concentration is significantly negatively correlated with market size and market liquidity, and significantly positively correlated with risk mis-pricing.

Fourth, note that countries that have stock markets that are more integrated internationally - *as measured by low APT and ICAPM values* - also have less volatile stock returns.

Fifth, countries with well-developed regulatory and institutional systems as defined by the IFC tend to have large, liquid stock markets.

Finally, although many stock market development indicators are significantly correlated in intuitively attractive ways, the correlation coefficients are frequently below 0.60. The correlations suggest that the different indicators capture different aspects of stock market development. To measure how well stock markets function in general, i.e., to compute an index of overall "stock market development," we need to incorporate the information contained in a broad selection of these indicators.

III. Which Stock Markets are Most Developed?

In the last section, we examined the level of stock market development indicator-by-indicator. We now address a related question: ***which stock markets are most developed overall?*** To do this, we construct conglomerate indexes of stock market development that aggregate the information contained in the individual indicators. We then use these conglomerate indexes to rank countries in terms of overall stock market development.

A. The Indexes

To compute conglomerate indexes of stock market development, we average the means-removed values of particular stock market development indicators. Specifically, when we construct INDEX-1 - which aggregates information on market capitalization, total value traded/GDP, and turnover, we follow a two-step procedure. First, for each country i we compute the means-removed market capitalization, total value traded/GDP, and turnover ratios. We define the means-removed value of variable X for country i as

$X(i)^m = [X(i) - \text{mean}(X)] / [\text{ABS}(\text{mean}(X))]$, where ABS (z) refers to the absolute value of z. For mean (X), we use the average value of X across all countries over the 1976-93 period. Note, for the risk mis-pricing measures (APT and ICAPM) and the market concentration where *larger* number refer to *less* stock market development, we multiply the indicator numbers by negative 1 before computing the means-removed values. Second, we take a simple average of the means-removed market capitalization, total value traded, and turnover ratios to obtain an overall index of stock market development, INDEX-1.

INDEX-2 combines INDEX-1 with the APT mis-pricing measure to obtain an overall indicator of stock market development that incorporates international integration. INDEX-2 only

includes the 23 countries with APT estimates. In contrast, INDEX-2A takes the average for the 41 country sample. For countries with no APT values, INDEX-2A computes the average based on the means-removed values of the other three indicators: market capitalization, total value traded/GDP, and turnover.

INDEXEs-3 and 3A are very similar to INDEXEs-2 and 2A. INDEX-3 combines INDEX-1 with the ICAPM mis-pricing measure. INDEX-3 only includes the 23 countries with ICAPM mis-pricing estimates. INDEX-3A, however, takes the average for the 41 country sample. For countries with no ICAPM values, INDEX-2A computes the average based on the means-removed values of the other three indicators: market capitalization, total value traded/GDP, and turnover.

Finally, INDEX-4 averages the means-removed values of market capitalization, total value traded, turnover, APT mis-pricing, and market concentration. We only compute this index for the 21 countries with data on all five underlying indicators.

B. Stock Market Development Rankings

Table 6 gives the country-by-country values and rankings for the six INDEXES. While there are variations in country rankings from INDEX-1 through INDEX-4, the INDEXES are very highly correlated. Table 7 shows that the INDEXES have correlation coefficients of 0.99. Thus, the various conglomerate INDEXES give very similar country rankings. Here we briefly summarize the results from INDEX-1 and INDEX-4.

Consider first INDEX-4, which aggregates the largest number of individual stock market development indicators but also has the fewest countries. The INDEX-4 variable says that Japan,

the United States, Great Britain, and Korea have the most developed stock markets when aggregating information on market size, liquidity, international integration, and market concentration. Colombia, Venezuela, Nigeria, and Zimbabwe have the lowest four rankings in this 21 country sample.

Next, consider INDEX-1 that aggregates the least information but includes the most countries (41) with data on all the underlying indicators (see Figure 1). INDEX-1 ranks Japan, Hong Kong, Germany, Great Britain, the United States, Korea, Singapore, and Malaysia as having very highly developed stock markets when aggregating information on market size and liquidity. INDEX-1 implies that Nigeria, Colombia, Pakistan, and Zimbabwe, have the least-developed stock markets. As noted above, Germany's high ranking is strongly influenced by the tumultuous years surrounding re-unification when there was an explosion of equity transactions.[6]

While it is difficult to answer unambiguously the question posed at the start of this section - ***which stock markets are most developed?***, our evaluation of the indexes presented in Table 6 suggests the following conclusion. The three most developed markets are Japan, the United States, and Great Britain. The most underdeveloped markets are Colombia, Venezuela, Nigeria, and Zimbabwe. Furthermore, the data suggest that Hong Kong, Singapore, Korea, Switzerland, and Malaysia have highly-developed stock markets, while Turkey, Greece, Argentina, and Pakistan have underdeveloped markets.

Before concluding this section, we want to make two additional points. First, there is a close correspondence between income per capita and stock market development. To illustrate

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[6] If Germany's two years of exceptionally high trading are removed in computing its averages over the 1986-93 period, Germany falls from the top ten.

this point, we rank the 41 countries by GDP per capita. We then divide the sample into groups of 11, 10, 10, and 10 countries based on these GDP per capita rankings. The first group has average GDP per capita of about $800, the second group $3,350, the third group $12,480 and the last group $19,670. In Figure 2, we then plot the value of INDEX-1 for each of these income groups. As depicted, poorer countries have lower stock market development than richer countries on average.[7] Second, there are important exceptions. Frequently, many markets termed "emerging" - such as Korea, and Malaysia, and Thailand - are uniformly ranked higher than markets termed "developed" - such as France, the Netherlands, Australia, Canada, Sweden, and many other European countries.

IV Which Stock Markets are Developing Most Rapidly?

In the last section, we ranked countries according to their average levels of stock market development over the 1986-1993 period. We now address the question, ***which stock markets are developing most rapidly?*** To do this, we rank countries according to how fast their stock markets are developing. We use the growth rates of the individual indicators to compute the speed of stock market development.

A. The Growth Rates of Individual Stock Market Development Indicators

Table 8 presents the average annual growth rates of the individual stock market development indicators over the 1986-1993 period. Given the large number of indicators, we do

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[7] This same story holds for the other INDEXES and when using the World Bank's classification of countries: low, middle, and high income countries.

not systematically describe the information in Table 8. Instead, we highlight three points. First, in terms of market size, Indonesia and Turkey boomed over this period growing at average annual rate of more than 100% per year! As a benchmark, United States market capitalization grew at 4% annual rate over the 1986-1990 period. At the other extreme, Finland, Japan, Germany, Sweden, New Zealand, and Italy saw their market capitalization ratios shrink over the 1986-1993 period. Using another measure of market size, Indonesia, Turkey, Portugal, and Thailand saw the number of listed companies grow at an annual rate of over 18%.

Second, as measured by total value traded/GDP, Indonesia, Portugal, and Turkey, Venezuela, and Greece experienced rapid liquidity growth (>200%), while Japan and Italy weathered rapid declines (≈ -10%). As with total value traded, the turnover measure of liquidity identifies Indonesia as the fastest growing market in terms of liquidity.

Third, some cross-country quandaries emerge from studying stock market growth. Consider, for example, the cases of Mexico and Portugal. Both countries liberalized their capital markets and privatized public enterprises and both countries experienced very rapid improvements in international integration (as measured by the APT mis-pricing indicator). In terms of market volatility, Mexico saw rapid declines in return volatility as it liberalized its economy and privatized state enterprises. In contrast, stock return volatility in Portugal exploded as it liberalized its capital markets and privatized its public enterprises. Another noteworthy difference between the two countries is that while market concentration has grown dramatically in Mexico, it shrunk steadily in Portugal. We hope to explore - and motivate others to explore - the reasons underlying these differences in future work.

B. Growth Rates of Stock Market Development Indicators

We found it difficult to assess which markets experienced the most rapid overall development using individual stock market development indicators. Thus, we now evaluate the growth rate of overall stock market development indexes. We compute five conglomerate indexes of stock market development that are very similar to the ones used in the previous section. In the previous section, the goal was to compare the level of stock market development across countries. Here, however, we seek to measure the growth rate of each country's level of overall stock market development. Consequently, we now use the growth rate of each country's stock market indicator. Then, we average these growth rates to compute an overall index of stock market development.

Specifically, when we construct INDEX-1 - which aggregates information on market capitalization, total value traded/GDP, and turnover, we compute the average annual growth rate for market capitalization, total value traded/GDP, and turnover ratios for each country. We then take a simple average of the growth rates to obtain an overall index of stock market development for each country. This index allows us examine the growth rate of each country's overall level of stock market development.

As before, we compute five different INDEXES. Here we use the same names because they include the same individual stock market indicators as in Section III. Thus, INDEX-2 combines the growth rates of market capitalization, total value traded/GDP, turnover, and the APT mis-pricing measure. INDEX-2 only includes countries with APT mis-pricing estimates. As before, INDEX-2A takes the average for the 41 country sample. If data are not available on APT mis-pricing, INDEX-2A simply averages across the growth rates of market capitalization,

total value traded/GDP, and turnover. INDEXEs-3 and 3A are the same as INDEXEs-2 and 2A except that INDEX-3 and 3A use the ICAPM mis-pricing measure instead of the APT mis-pricing measure. Finally, INDEX-4 averages the annual growth rates of market capitalization, total value traded, turnover, APT mis-pricing, and market concentration. We only compute this index for the 21 countries with data on all five underlying indicators for the 1986-93 period.

Table 9 reports the INDEXES of overall stock market growth and Figure 3 illustrates this growth using INDEX-1. The main findings are straightforward. Regardless of the index we look at, Indonesia, Turkey, Portugal and Venezuela have experienced the most rapid overall stock market development over the last 18 years. While these markets began the period with underdeveloped markets, other countries with similarly underdeveloped stock markets, like Colombia, Pakistan, and Zimbabwe did not enjoy the explosive development experienced by Indonesia, Turkey, Portugal, and Venezuela. We plan to investigate both the underlying causes of this rapid development and the economic consequences of rapid stock market development in future research.[8]

[8] We also investigated whether initially under-developed stock markets grow faster. These results are reported in Table 10. There is mixed evidence in support of convergence. Initially small markets grow faster but liquidity does not rise significantly. Initially volatile markets that poorly price risk tend to grow larger but not necessarily more liquid.

V. Is Stock Market Development Linked to the Rest of the Financial System?

We now turn to this paper's final question: ***Do countries with well developed stock markets also have well-developed banks and nonbank financial intermediaries?*** To address this question, we fist need measures of financial intermediary development. Thus, this section's first subsection discusses our measures of the (a) size of the financial system, (b) size and efficiency of the banking system, (c) size of nonbank financial corporations, and (d) size of private insurance and private pension funds. The second subsection then examines the correlation between stock market and financial intermediary development. We find a strong positive relationship between stock market development and financial intermediary development.

A. Financial Intermediary Indicators

A.1. Financial system development: Based on work by King and Levine (1993), we use three measures of financial system development. The measure M3/GDP equals liquid liabilities of the financial intermediaries divided by GDP. Basically, this indicator measures M3 divided by GDP. It is a measure of the overall size of the formal financial system. If the size of the financial system is positively related to the provision of financial services, then M3/GDP should be a good indicator of the provision of financial intermediary services.

QLLY equals M3-M1/GDP and thus subtracts narrow money from the M3/GDP measure of financial intermediary size. QLLY measures quasi-liquid liabilities. Analysts sometimes use QLLY instead of M3/GDP, because M1/GDP represents highly liquid bank deposits and therefore may not be as closely associated with efficient financial intermediation as longer-term

investments in financial intermediaries. Thus, QLLY focuses on measuring longer-term liabilities - quasi-liquid liabilities: M3-M1.

Since liquid and quasi-liquid liabilities that finance government deficits may not reflect the provision of efficient financial intermediary services (such as acquiring information about firms, monitoring managers, and facilitating transactions and risk diversification), we also compute the variable PRIV/GDP. PRIV/GDP equals the ratio of domestic credit to private firms divided by GDP.[9]

Table 11 indicates that Hong Kong, Japan, and Switzerland have well-developed financial system as measured by M3/GDP, QLLY, and PRIV/GDP. In contrast, Argentina, Brazil, Mexico, Colombia, and Nigeria had very underdeveloped financial systems as revealed by these three indicators over the 1986-1993 period.

A.2. Bank development: To measure the level of development of the banking system we use BY/GDP, which equals the ratio of the total claims of deposit money banks to GDP. The three countries with the largest BY/GDP variables are Switzerland, Luxembourg, and Japan. At the other extreme, Colombia, Nigeria, and Argentina had the lowest ratio of bank credit to GDP

[9] Unfortunately, while the International Financial Statistics classifies credit as "claims on the private sector," some of these claims in some countries include credit to public enterprises.

over the 1986-1993 period. Also, we compute a measure of banking "efficiency." SPREAD equals the difference between bank lending and borrowing rates.[10]

A.3. Nonbank development: We also measure the size of nonbank financial corporations, such as finance companies, mutual funds, brokerage houses, etc. PNB/GDP equals private nonbank financial intermediary assets divided by GDP. The four countries with the largest ratio of nonbank financial intermediary assets to GDP were Sweden, Singapore, Korea, and the United States. Indonesia, Pakistan, Turkey, and the Netherlands had very low values of PNB/GDP over the 1986-1993 period.[11]

A.4. Insurance and Pension Companies: Finally, we measure the size of private insurance and pension companies. INPE/GDP equals private insurance company and pension fund assets divided by GDP. The three countries with the largest ratio of private insurance company and pension fund assets to GDP were the Netherlands, Great Britain, and the United States. the Philippines, Thailand, and Pakistan had very low INPE/GDP ratios.

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[10] This measure may not accurately capture banking efficiency because the interest rate data may not accurately reflect borrowing and lending costs. SPREAD also will not provide accurate information on how well banks monitor firm managers, nor will SPREAD capture government intervention in the banking system in an very informative way. But, SPREAD is widely used and availabe across countries. We include it for completeness. For better measures of financial repression for a few select countries see Giovannini and De Melo (1993).

[11] We collected data on private nonbank financial corporations, insurance companies, and pension funds from individual country reports, including documents published by Ministries of Finance, Central Banks, and regulatory agencies.

B. Correlations Among Financial Intermediary Indicators

Table 12 presents the correlations among the financial intermediary indicators discussed above. The measures of financial system size, M3/GDP, QLLY, and PRIV/GDP are very highly correlated. The correlation coefficients are 0.79 or higher and significant at the 0.01 level.

The correlations between the financial system size indicators and indicators of the size of banks, private nonbanks, and private insurance and pension companies are not as strong. While all of the correlations are positive, many are not significant. Furthermore, of those that are significant, the correlation coefficient is frequently below 0.50. While positively related, the different financial intermediary indicators give different country rankings of financial intermediary development. These differences reflect different financial structures across countries, where we define "financial structure" as the combination of financial intermediaries and financial markets that compose a country's financial system.[12] For example, while countries with big financial systems have big banks and nonbank financial corporations, the correlation between financial system size and private insurance and pension companies is not strong.

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[12] Differences in financial structure may reflect legal differences. For example, countries with universal banking as distinct from the more segreated legal and regulatory impediments of the United States may develop different combinations of financial intermediaries. The overall size of the financial system across countries with different financial structures, however, may be similar and the provision of financial services to investors and firms may also be similar.

C. Financial Intermediary Development Indicators

Since we want to compare an overall measure of financial intermediary development with our stock market development indicators, we now construct conglomerate indexes of financial intermediary development. Using the same procedure for constructing conglomerate indexes discussed above, this section constructs three different financial intermediary INDEXES. We call these FINDEX-1, FINDEX-2, and FINDEX-3. FINDEX-1 averages the means-removed values of M3/GDP and PRIV/GDP. Thus, FINDEX-1 is a conglomerate index of the overall size of the financial system, particularly the financial system financing of the private sector. FINDEX-2 averages the means-removed values of M3/GDP, PRIV/GDP, PNB/GDP, and INPE/GDP. FINDEX-2 aggregates information on financial system size and both private nonbanks and private insurance companies and pension funds. FINDEX-3 combines the means-removed values of BY/GDP, PNB/GDP, and INPE/GDP. Thus, FINDEX-3 focuses on combining information on the size of the banking system, the size of private nonbank financial corporations, and private insurance companies and pension funds. Table 13 provides the country rankings and the values of these FINDEXES over the 1986-1993 period. The FINDEXES are highly correlated with correlation coefficients above 0.74 and P-values less than 0.01 (Table 14).

The results in Table 11 on FINDEX-3 - which aggregates information on banks, private nonbanks, private insurance companies, and private pension funds - suggest that the top 5 financial intermediary countries are Switzerland, Sweden, Luxembourg, Australia, and

Singapore. The bottom 5 countries in terms of average financial intermediary development over the 1986-1993 period are Colombia, Pakistan, Philippines, Turkey, and Mexico.[13]

D. Stock Market Development and Financial Intermediary Development

Armed with the financial intermediary indicators and financial intermediary conglomerate indexes we can now shed some empirical light on the question, ***Do countries with well-developed stock markets also have well-developed banks and nonbank financial intermediaries?*** The answer that emerges from Tables 15, 16, 17, and 18 is yes.

Table 15 presents the correlations between individual stock market indicators and individual indicators of financial intermediary development. Table 16 provides rank correlations. Instead of describing the statistics in detail, we simply highlight three points. First, stock market size and liquidity (as measured by total value traded/GDP) are positively correlated with all of the financial intermediary indicators and significantly correlated with all of the financial intermediary indicators except INPE/GDP (the assets of private insurance and pension companies divided by GDP). Second, volatility is significantly negatively correlated with all the financial intermediary indicators except for PNB/GDP (private nonbank assets/GDP). Thus, countries with well-developed financial intermediaries, large banks, and large private insurance companies and pension funds tend to have less volatile stock markets. Third, countries with

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[13] We prefer FINDEX-3 to the other financial intermediary indexes because it combines information on particular financial intermediaries: banks, nonbanks, insurance companies, and pension funds. The other INDEXES mix information on particular intermediaries with information on intermediary liabilities and the measures of liabilities span across different types of intermediaries.

stock markets that internationally integrated tend to have large financial systems and banks than less internationally integrated markets.

Using the stock market conglomerate INDEXES and the financial intermediary conglomerate FINDEXES, the strong positive correlation between stock market development financial intermediary development emerges even more strongly. As shown in Table 17, stock market INDEXES are all significantly correlated with financial intermediary FINDEXES at the 0.01 level. Figure 4 illustrates this correlation using INDEX-1 and FINDEX-3.

Furthermore, measures of stock market inefficiency as represented APT, ICAPM, and CAPM, are positively correlated with banking inefficiency as measured by interest rate spread. Even with about 20 observations, CAPM and ICAPM are significantly negatively correlated with SPREAD. Stock market development (including measures of risk pricing efficiency) and financial intermediary development (including measures of banking efficiency) go hand-in-hand.

VI. Conclusions

Having collected and summarized information on a wide assortment of indicators of stock market size, liquidity, efficiency, volatility, concentration, and the development of the regulatory system, we review five findings.

(1) In the 41 country that we study, there are enormous cross-country differences in the level of stock market development for each particular indicator. For example, the ratio of market capitalization to GDP is greater than 1 in five countries and less than 0.10 in five countries.

(2) There are intuitively appealing correlations among the individual stock market

development indicators. For example, big markets tend to be less volatile, more liquid, and less concentrated in a few stocks. Internationally integrated markets tend to be less volatile, and institutionally developed markets tend to be large and liquid.

(3) Aggregating together the individual stock market development indicators, we find that the three most developed markets are Japan, the United States, and Great Britain. The most underdeveloped markets are Colombia, Venezuela, Nigeria, and Zimbabwe. The data also suggest that Korea, Switzerland, and Malaysia have highly-developed stock markets, while Turkey, Greece, Argentina, and Pakistan have underdeveloped markets. Furthermore, while richer countries generally have more developed stock markets than poorer countries, many markets labeled "emerging" - such as Hong Kong, Singapore, Korea, Malaysia, and Thailand - are systematically more developed than markets labeled "developed" - such as France, the Netherlands, Australia, Canada, Sweden, and Norway.

(4) Over the 1986-1993 period, some markets exhibit very rapid development in terms of size, liquidity, and international integration. Specifically, Indonesia, Turkey, Portugal, and Venezuela have experienced explosive development. Future case studies into the underlying causes of this rapid development and the economic consequences of rapid stock market development could yield valuable insights.

(5) We find that across countries, the level of stock market development is highly correlated with the development of the banks, nonbanks, and insurance companies, and private pension funds.

In this paper, the goal has not been to test specific hypotheses rigorously. Rather, our objectives have been to compare different stock market development indicators, highlight some important correlations, and most importantly stimulate future research into the links between stock market development and economic development.

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Table 1: Stock Market Development Indicators, Size and Turnover, 1986-1993

Market Capitalization		Total Value Traded/GDP		Number of Listed Companies		Turnover	
South Africa	1.54	Japan	0.62	United States	7087	Germany	1.47
Hong Kong	1.36	Hong Kong	0.59	India	4614	Korea	0.93
Malaysia	1.28	Malaysia	0.46	Japan	2027	Israel	0.72
Japan	1.08	United States	0.41	Great Britain	1932	Thailand	0.70
Singapore	1.04	Great Britain	0.41	Australia	1184	Austria	0.69
Great Britain	0.92	Korea	0.37	Canada	1118	United States	0.65
Switzerland	0.77	Singapore	0.35	South Africa	700	Mexico	0.56
United States	0.64	Germany	0.35	France	641	Japan	0.54
Jordan	0.57	Switzerland	0.31	Brazil	579	India	0.50
Australia	0.54	Thailand	0.22	Korea	576	Norway	0.48
Chile	0.52	Netherlands	0.21	Germany	551	Brazil	0.48
Netherlands	0.49	Australia	0.17	Pakistan	487	Hong Kong	0.44
Canada	0.48	Canada	0.15	Spain	383	Great Britain	0.44
Sweden	0.46	Jordan	0.13	Hong Kong	318	Netherlands	0.41
Korea	0.40	Israel	0.11	Israel	312	Switzerland	0.39
New Zealand	0.39	Sweden	0.10	Malaysia	291	France	0.35
Thailand	0.36	Norway	0.09	Denmark	267	Spain	0.35
Belgium	0.36	France	0.09	Netherlands	239	Singapore	0.34
Denmark	0.28	Mexico	0.09	Italy	227	Argentina	0.34
France	0.27	Spain	0.08	New Zealand	226	Canada	0.31
Spain	0.25	South Africa	0.08	Chile	225	Australia	0.31
Germany	0.24	Austria	0.07	Thailand	210	Turkey	0.28
Philippines	0.24	Denmark	0.07	Luxembourg	205	Denmark	0.24
Mexico	0.22	New Zealand	0.06	Taiwan	197	Italy	0.24
Israel	0.21	India	0.06	Mexico	193	Sweden	0.24
Finland	0.19	Brazil	0.05	Argentina	187	Malaysia	0.24
Norway	0.19	Finland	0.04	Belgium	182	Indonesia	0.23
Zimbabwe	0.18	Belgium	0.04	Switzerland	176	Philippines	0.23
Italy	0.16	Italy	0.04	Portugal	162	Jordan	0.22
Portugal	0.16	Chile	0.04	Philippines	152	Finland	0.21
India	0.16	Philippines	0.04	Singapore	147	Portugal	0.20
Greece	0.12	Portugal	0.03	Sweden	133	New Zealand	0.17
Pakistan	0.11	Turkey	0.03	Nigeria	127	Venezuela	0.15
Brazil	0.11	Argentina	0.02	Greece	126	Greece	0.13
Austria	0.10	Venezuela	0.02	Norway	126	Belgium	0.12
Venezuela	0.10	Indonesia	0.02	Jordan	103	Pakistan	0.08
Turkey	0.08	Greece	0.02	Turkey	91	Chile	0.08
Colombia	0.07	Pakistan	0.01	Indonesia	91	Colombia	0.07
Indonesia	0.06	Zimbabwe	0.01	Austria	90	South Africa	0.05
Argentina	0.06	Colombia	0.01	Colombia	87	Zimbabwe	0.03
Nigeria	0.04	Nigeria	0.00	Venezuela	82	Nigeria	0.01
				Finland	62		
				Zimbabwe	57		

Market capitalization is the value of stocks divided by GDP. Total value traded/GDP is total value of traded shares divided by GDP. Number of shares listed are the number of shares listed on the exchange. Turnover is given by total value traded divided by market capitalization. All values are 1986-1993 averages.

Table 2: Stock Market Development Indicators, 1986-1993
Volatility, Concentration, Institutions, International Integration

Volatility		Market Concentration		Institutional Indicator		APT Mis-Pricing		ICAPM Mis-Pricing	
Pakistan	0.03	United States	0.14	Malaysia	1.63	Japan	2.39	Jordan	2.05
United States	0.03	Japan	0.19	Mexico	1.61	Jordan	2.55	Pakistan	2.15
Netherlands	0.03	India	0.22	Korea	1.55	Pakistan	2.59	United States	2.24
Portugal	0.03	Great Britain	0.24	Brazil	1.54	United Stat	2.71	Japan	2.26
Canada	0.04	Pakistan	0.25	Chile	1.52	Great Britai	2.94	Malaysia	2.45
Belgium	0.04	France	0.26	Portugal	1.37	Thailand	3.12	Great Britain	2.56
Jordan	0.04	Brazil	0.26	Thailand	1.36	India	3.33	India	2.89
Switzerland	0.04	Canada	0.27	India	1.34	Nigeria	3.66	Indonesia	3.03
Great Britain	0.04	Korea	0.28	Philippines	1.32	Indonesia	3.68	Korea	3.18
Germany	0.04	Mexico	0.36	Argentina	1.16	Korea	3.73	Thailand	3.18
Australia	0.04	Thailand	0.36	Colombia	1.16	Malaysia	3.90	Nigeria	3.72
Japan	0.04	Malaysia	0.36	Jordan	1.16	Portugal	4.02	Australia	4.14
Finland	0.05	Taiwan	0.40	Pakistan	1.09	Australia	4.94	Chile	4.25
Austria	0.05	Portugal	0.41	Turkey	1.06	Argentina	4.98	Taiwan	4.54
France	0.05	Germany	0.41	Venezuela	1.00	Philippines	5.26	Colombia	4.82
New Zealand	0.05	Zimbabwe	0.44	Taiwan	0.98	Greece	5.29	Philippines	4.90
Malaysia	0.05	Greece	0.47	Indonesia	0.96	Chile	5.56	Venezuela	5.15
Israel	0.06	Turkey	0.50	Greece	0.77	Zimbabwe	5.57	Zimbabwe	5.18
Spain	0.06	Chile	0.50	Zimbabwe	0.66	Colombia	5.62	Greece	5.23
Italy	0.06	Switzerland	0.50	Nigeria	0.64	Taiwan	5.68	Portugal	5.28
Ireland	0.06	Nigeria	0.51			Mexico	5.94	Mexico	5.77
Sweden	0.06	Philippines	0.52			Turkey	6.38	Turkey	6.66
Colombia	0.06	Jordan	0.59			Venezuela	6.67	Brazil	6.92
India	0.06	Venezuela	0.63			Brazil	7.26	Argentina	11.58
Chile	0.06	Argentina	0.64						
Thailand	0.07	Colombia	0.74						
Norway	0.07								
Zimbabwe	0.07								
Philippines	0.08								
Korea	0.08								
Greece	0.10								
Mexico	0.10								
Venezuela	0.13								
Taiwan	0.15								
Turkey	0.17								
Brazil	0.25								
Argentina	0.34								

Volatility is twelve-month rolling standard deviation estimate based on market returns.
Institutional indicator is an average of institutional indicators given in Table 3. Market concentration is the share of market capitalization held by ten largest stocks.
APT and ICAPM mispricing indicators are obtained from Korajczyk (1994).
All values are 1986-1993 averages.

Table 3: Institutional Indicators - 1986-1993 Averages

	2	3	4	5		6		7
	Regular publication of p/e yield	Accounting standards	Quality of investor protection	Securities exchange commission	Dividend repat.	Restrictions on Capital repat.	Entry	Average Institutional Indicator
Malaysia	1.00	2.00	2.00	0.38	2.00	2.00	2.00	1.63
Mexico	1.00	2.00	2.00	1.00	1.75	1.75	1.75	1.61
Korea	1.00	2.00	2.00	1.00	2.00	1.63	1.25	1.55
Brazil	0.75	2.00	2.00	1.00	2.00	1.50	1.50	1.54
Chile	0.88	2.00	2.00	1.00	1.75	1.00	2.00	1.52
Portugal	0.71	1.14	1.00	1.00	1.71	2.00	2.00	1.37
Thailand	1.00	1.00	1.00	1.00	1.75	1.75	2.00	1.36
India	0.50	2.00	2.00	1.00	1.38	1.50	1.00	1.34
Philippines	0.88	1.75	1.00	1.00	1.75	1.75	1.13	1.32
Jordan	0.00	0.25	1.00	1.00	2.00	1.88	2.00	1.16
Colombia	0.25	1.00	1.00	1.00	1.38	2.00	1.50	1.16
Argentina	0.25	1.00	1.00	1.00	1.25	1.63	2.00	1.16
Pakistan	0.13	1.00	1.00	1.00	1.50	1.50	1.50	1.09
Turkey	0.67	0.75	0.25	1.00	1.75	1.75	1.38	1.06
Indonesia	1.00	0.16	0.83	1.00	1.29	1.29	1.71	1.04
Venezuela	0.25	1.00	1.00	1.00	1.00	1.00	1.75	1.00
Taiwan	0.75	0.25	0.13	1.00	1.63	2.00	1.13	0.98
Greece	0.67	0.43	0.14	0.14	1.13	1.00	1.88	0.77
Zimbabwe	0.13	1.00	1.00	1.00	0.13	0.25	1.13	0.66
Nigeria	0.00	1.00	1.00	1.00	0.75	0.75	0.00	0.64

Figures in columns 2-6 are 1986-1993 averages. In each year columns can take the following values:
Column (2) 0 = *published, 1 = comprehensive and published internationally*
Columns (3) and (4), 0 = poor, 1 = adequate, 2 = good, of internationally acceptable quality
Column (5) 1 = functioning securities exchange commission or similar government agency, 0 = no agency
Column (6) 0 = restricted, 1 = some restrictions, 2 = free
Column (7) is the average of columns (2) -(6). Also reported in Table 2.

The table is based on the information provided in the IFC's Factbook.

Table 4: Correlations of Stock Market Indicators, 1986-1993

	Market Capitalization	Total Value Traded/GDP	Turnover	APT Mis-Pricing	ICAPM Mis-Pricing	Volatility	Market Concentration	Institutional Development
Market Capitalization	1	0.74	0.01	-0.47	-0.52	-0.37	-0.38	0.51
	0	*0*	*0.96*	*0.02*	*0.01*	*0.03*	*0.06*	*0.02*
	41	*41*	*41*	*23*	*23*	*35*	*25*	*19*
Total Value Traded		1	0.5	-0.54	-0.49	-0.29	-0.52	0.57
		0	*0*	*0.01*	*0.02*	*0.09*	*0.01*	*0.01*
		41	*41*	*23*	*23*	*35*	*25*	*19*
Turnover			1	-0.26	-0.13	-0.04	-0.4	0.61
			0	*0.22*	*0.54*	*0.83*	*0.05*	*0.01*
			41	*23*	*23*	*35*	*25*	*19*
APT Mis-Pricing				1	0.68	0.58	0.47	0
				0	*0*	*0*	*0.03*	*0.99*
				24	*24*	*22*	*22*	*20*
ICAPM Mis-Pricing					1	0.88	0.5	-0.05
					0	*0*	*0.02*	*0.85*
					24	*22*	*22*	*20*
Volatility						1	0.32	-0.06
						0	*0.12*	*0.81*
						37	*25*	*18*
Market Concentration							1	-0.39
							0	*0.1*
							26	*19*
Institutional Development								1
								0
								20

P-values and number of observations are given in italics. Variable definitions are given in Tables 1 and 2.

Table 5: Rank Correlations of Stock Market Development Indicators 1986-1993								
	Market Capitalization	Total Value Traded/GDP	Turnover	APT Mis-Pricing	ICAPM Mis-Pricing	Volatility	Market Concentration	Institutional Development
Market Capitalization	1	0.81	0.2	-0.44	-0.54	-0.51	-0.43	0.62
	0	*0*	*0.2*	*0.03*	*0.01*	*0*	*0.03*	*0*
	41	*41*	*41*	*23*	*23*	*35*	*25*	*19*
Total Value Traded		1	0.69	-0.42	-0.43	-0.4	-0.56	0.83
		0	*0*	*0.05*	*0.04*	*0.02*	*0*	*0*
		41	*41*	*23*	*23*	*35*	*25*	*19*
Turnover			1	-0.25	-0.13	0	-0.56	0.62
			0	*0.24*	*0.54*	*0.99*	*0*	*0*
			41	*23*	*23*	*35*	*25*	*19*
APT Mis-Pricing				1	0.85	0.78	0.43	0
				0	*0*	*0*	*0.05*	*0.99*
				24	*24*	*22*	*22*	*20*
ICAPM Mis-Pricing					1	0.76	0.43	-0.03
					0	*0*	*0.05*	*0.89*
					24	*22*	*22*	*20*
Volatility						1	0.36	-0.18
						0	*0.08*	*0.48*
						37	*25*	*18*
Market Concentration							1	-0.42
							0	*0.07*
							26	*19*
Institutional Development								1
								0
								20

P-values and number of observations are given in italics. Variable definitions are as given in Tables 1 and 2.

Table 6: Stock Market Development Aggregate Indexes							
INDEX 1:		INDEX 2:		INDEX 3:		INDEX 4:	
MCAP, TVT, TOR		INDEX 1 + APT		INDEX 1 + ICAPM		INDEX 2 + Concentration	
Japan	2.02	Japan	1.63	Japan	1.63	Japan	1.41
Hong Kong	2.01	United State	1.01	United State	1.03	United State	0.94
Germany	1.38	Great Britai	1.01	Great Britai	1.02	Great Britai	0.89
Great Britai	1.23	Korea	0.84	Korea	0.85	Korea	0.73
United State	1.21	Malaysia	0.72	Malaysia	0.79	Malaysia	0.60
Korea	1.05	Thailand	0.36	Thailand	0.36	Thailand	0.31
Singapore	1.04	Australia	0.12	Australia	0.15	India	-0.01
Malaysia	0.90	Jordan	0.04	Jordan	0.07	Jordan	-0.06
Switzerland	0.75	India	-0.13	India	-0.11	Mexico	-0.11
South Africa	0.48	Mexico	-0.16	Mexico	-0.17	Brazil	-0.23
Thailand	0.38	Brazil	-0.38	Chile	-0.34	Pakistan	-0.33
Netherlands	0.32	Chile	-0.40	Brazil	-0.37	Portugal	-0.34
Australia	0.19	Portugal	-0.42	Philippines	-0.42	Chile	-0.37
Canada	0.09	Philippines	-0.43	Indonesia	-0.48	Philippines	-0.40
Israel	0.08	Argentina	-0.47	Portugal	-0.49	Argentina	-0.50
Jordan	-0.08	Pakistan	-0.51	Pakistan	-0.49	Greece	-0.52
Sweden	-0.10	Indonesia	-0.52	Greece	-0.60	Turkey	-0.54
Mexico	-0.14	Greece	-0.61	Venezuela	-0.61	Zimbabwe	-0.56
Austria	-0.15	Turkey	-0.61	Turkey	-0.62	Nigeria	-0.59
Norway	-0.18	Nigeria	-0.67	Zimbabwe	-0.66	Venezuela	-0.66
France	-0.21	Zimbabwe	-0.67	Nigeria	-0.67	Colombia	-0.73
Spain	-0.25	Venezuela	-0.68	Colombia	-0.68		
India	-0.26	Colombia	-0.71	Argentina	-0.87		
Brazil	-0.29						
New Zealan	-0.33						
Denmark	-0.37						
Chile	-0.46						
Belgium	-0.47						
Italy	-0.51						
Finland	-0.53						
Philippines	-0.54						
Argentina	-0.59						
Portugal	-0.61						
Turkey	-0.61						
Indonesia	-0.71						
Greece	-0.73						
Venezuela	-0.74						
Zimbabwe	-0.81						
Pakistan	-0.82						
Colombia	-0.88						
Nigeria	-0.96						
Aggregate indexes combine different indicators. INDEX 1 is the average of market capitalization, total							
value traded/GDP and turnover. INDEX 2 adds APT mispricing to INDEX 1. INDEX 3 adds ICAPM mispricing							
to INDEX 1. INDEX 4 adds market concentration to INDEX 2. Exact calculation of indexes are discussed in							
the text. Definitions of indicators are as given in Tables 1 and 2.							

Table 6 (cont.): Stock Market Development Aggregate Indexes						
Averaging over Stock Market Indicators						
INDEX 2A:		INDEX 3A:				
INDEX 1 + APT		INDEX 1 + ICAPM				
Hong Kong	2.01	Hong Kong	2.01			
Japan	1.63	Japan	1.63			
Germany	1.38	Germany	1.38			
Singapore	1.04	Singapore	1.04			
United States	1.01	United States	1.03			
Great Britain	1.01	Great Britain	1.02			
Korea	0.84	Korea	0.85			
Switzerland	0.75	Malaysia	0.79			
Malaysia	0.72	Switzerland	0.75			
South Africa	0.48	South Africa	0.48			
Thailand	0.36	Thailand	0.36			
Netherlands	0.32	Netherlands	0.32			
Australia	0.12	Australia	0.15			
Canada	0.09	Canada	0.09			
Israel	0.08	Israel	0.08			
Jordan	0.04	Jordan	0.07			
Sweden	-0.10	Sweden	-0.10			
India	-0.13	India	-0.11			
Austria	-0.15	Austria	-0.15			
Mexico	-0.16	Mexico	-0.17			
Norway	-0.18	Norway	-0.18			
France	-0.21	France	-0.21			
Spain	-0.25	Spain	-0.25			
New Zealand	-0.33	New Zealand	-0.33			
Denmark	-0.37	Chile	-0.34			
Brazil	-0.38	Brazil	-0.37			
Chile	-0.40	Denmark	-0.37			
Portugal	-0.42	Philippines	-0.42			
Philippines	-0.43	Belgium	-0.47			
Belgium	-0.47	Indonesia	-0.48			
Argentina	-0.47	Portugal	-0.49			
Pakistan	-0.51	Pakistan	-0.49			
Italy	-0.51	Italy	-0.51			
Indonesia	-0.52	Finland	-0.53			
Finland	-0.53	Greece	-0.60			
Greece	-0.61	Venezuela	-0.61			
Turkey	-0.61	Turkey	-0.62			
Nigeria	-0.67	Zimbabwe	-0.66			
Zimbabwe	-0.67	Nigeria	-0.67			
Venezuela	-0.68	Colombia	-0.68			
Colombia	-0.71	Argentina	-0.87			
INDEX 2A is calculated as INDEX 2, however the average does not include APT mispricing when it is not available.						
Similarly INDEX 3A is calculated as INDEX 3 except when ICAPM is not available. Then, the index value equals that of INDEX 1.						
Detailed discussion of the calculation of indexes are given in text.						

Table 7: Correlations of Stock Market Indexes, 1986-1993

	INDEX1	INDEX2	INDEX3	INDEX4	INDEX2A	INDEX3A
INDEX1	1	0.99	0.99	0.99	0.99	0.99
	0	*0*	*0*	*0*	*0*	*0*
	41	*23*	*23*	*21*	*41*	*41*
INDEX2		1	0.99	1.00	1	0.99
		0	*0*	*0*	*0*	*0*
		23	*23*	*21*	*23*	*23*
INDEX3			1	0.99	0.99	1
			0	*0*	*0*	*0*
			23	*21*	*23*	*23*
INDEX4				1	1	0.99
				0	*0*	*0*
				21	*21*	*21*
INDEX2A					1	1
					0	*0*
					41	*41*
INDEX3A						1
						0
						41

P-values and number of observations are given in italics. Variable definitions are as given in Table 6.

Table 8: Growth of Stock Market Development Indicators, 1986-1993									
Growth Market Capitalization		**Growth Number Listed Companies**		**Growth Total Value Traded / GDP**		**Growth Turnover**		**Growth Volatility**	
Indonesia	1.89	Indonesia	0.37	Indonesia	17.74	Indonesia	1.82	Mexico	-0.06
Turkey	1.02	Turkey	0.23	Portugal	3.25	Luxembourg	1.66	Germany	-0.05
Argentina	0.87	Portugal	0.20	Turkey	2.87	Belgium	1.54	Malaysia	-0.05
Venezuela	0.66	Thailand	0.18	Venezuela	2.77	Netherlands	1.39	New Zealand	-0.03
Philippines	0.61	Israel	0.15	Greece	2.50	Austria	0.91	Australia	-0.02
Thailand	0.57	Luxembourg	0.12	Austria	1.48	Turkey	0.65	Italy	-0.02
Israel	0.53	Taiwan	0.12	Malaysia	1.31	Israel	0.54	Jordan	-0.02
Portugal	0.51	Korea	0.09	Argentina	1.18	Venezuela	0.48	Belgium	-0.02
Greece	0.51	Hong Kong	0.09	Thailand	0.76	Norway	0.45	United States	-0.02
Mexico	0.49	Malaysia	0.09	Norway	0.67	Singapore	0.43	Taiwan	-0.02
Colombia	0.42	Pakistan	0.08	Mexico	0.62	Greece	0.43	Pakistan	-0.01
Austria	0.37	Nigeria	0.08	Jordan	0.58	Malaysia	0.40	Netherlands	-0.01
Zimbabwe	0.35	Austria	0.06	Philippines	0.57	Denmark	0.38	Zimbabwe	0.00
Malaysia	0.34	Switzerland	0.06	Denmark	0.55	Portugal	0.35	Great Britain	0.00
India	0.32	Singapore	0.06	Colombia	0.54	Germany	0.30	Thailand	0.01
Brazil	0.30	France	0.05	Israel	0.50	Switzerland	0.29	Chile	0.01
Korea	0.28	Greece	0.05	Zimbabwe	0.45	Hong Kong	0.25	Philippines	0.01
Pakistan	0.27	Philippines	0.05	Korea	0.43	Finland	0.24	Korea	0.01
Chile	0.27	Italy	0.05	Pakistan	0.40	Jordan	0.24	Switzerland	0.02
Jordan	0.12	South Africa	0.04	Singapore	0.34	Taiwan	0.17	Spain	0.03
Nigeria	0.10	Netherlands	0.04	Brazil	0.34	Argentina	0.17	Ireland	0.03
Switzerland	0.07	Mexico	0.04	Hong Kong	0.31	Italy	0.16	Canada	0.03
France	0.07	Finland	0.03	Chile	0.27	Great Britain	0.10	Norway	0.03
Denmark	0.06	Spain	0.03	Germany	0.26	New Zealand	0.10	Brazil	0.04
Norway	0.06	Chile	0.03	Nigeria	0.23	Spain	0.10	Israel	0.04
Hong Kong	0.06	Germany	0.02	New Zealand	0.20	Sweden	0.09	Austria	0.04
United States	0.04	Japan	0.02	Great Britain	0.20	South Africa	0.08	Finland	0.05
South Africa	0.04	Zimbabwe	0.02	Finland	0.19	Zimbabwe	0.06	Japan	0.06
Singapore	0.04	India	0.02	India	0.16	Australia	0.06	Greece	0.08
Great Britain	0.03	Canada	0.01	South Africa	0.13	France	0.06	Sweden	0.08
Australia	0.02	Venezuela	0.01	Netherlands	0.13	Thailand	0.05	Argentina	0.09
Netherlands	0.01	Australia	0.00	France	0.09	Canada	0.05	India	0.09
Belgium	0.00	Jordan	0.00	Spain	0.09	United States	0.02	France	0.10
Spain	0.00	Denmark	-0.01	Australia	0.08	Mexico	0.01	Turkey	0.13
Canada	0.00	Colombia	-0.01	Switzerland	0.05	Nigeria	-0.01	Colombia	0.15
Finland	-0.02	United States	-0.01	United States	0.04	Korea	-0.01	Venezuela	0.27
Japan	-0.03	Brazil	-0.01	Belgium	0.01	Colombia	-0.03	Portugal	0.85
Germany	-0.03	Belgium	-0.02	Canada	0.01	Philippines	-0.06		
Sweden	-0.05	Norway	-0.03	Sweden	-0.02	Japan	-0.07		
New Zealand	-0.05	Great Britain	-0.03	Japan	-0.12	India	-0.08		
Italy	-0.10	Argentina	-0.03	Italy	-0.14	Pakistan	-0.09		
		Sweden	-0.05			Brazil	-0.11		
		New Zealand	-0.11			Chile	-0.11		

Table 8 (cont): Growth of Stock Market Development Indicators, 1986-1993									
Growth ICAPM		Growth APT		Growth CAPM		Growth Concentration		Growth Institutional Development	
Indonesia	-0.26	Mexico	-0.15	Indonesia	-0.15	Thailand	-0.12	Turkey	0.29
Portugal	-0.26	Portugal	-0.14	Japan	-0.11	Japan	-0.09	Greece	0.22
Japan	-0.07	Japan	-0.10	Portugal	-0.10	Malaysia	-0.08	Venezuela	0.17
Mexico	-0.07	India	-0.06	Mexico	-0.03	Zimbabwe	-0.07	Nigeria	0.11
Malaysia	-0.02	Brazil	-0.03	Chile	-0.01	Jordan	-0.05	Zimbabwe	0.11
Philippines	0.00	United States	-0.02	Malaysia	0.01	Taiwan	-0.03	Argentina	0.09
Great Britain	0.00	Great Britain	-0.02	Colombia	0.02	Portugal	-0.03	Pakistan	0.09
India	0.00	Australia	-0.01	Brazil	0.02	Germany	-0.02	Taiwan	0.09
Korea	0.01	Nigeria	-0.01	Philippines	0.02	Nigeria	0.00	Philippines	0.06
Australia	0.01	Zimbabwe	-0.01	India	0.02	Greece	0.00	Colombia	0.05
United States	0.01	Chile	0.00	Taiwan	0.02	Venezuela	0.00	Thailand	0.04
Zimbabwe	0.04	Korea	0.03	United States	0.02	India	0.00	Jordan	0.04
Brazil	0.05	Philippines	0.04	Pakistan	0.03	Turkey	0.01	Mexico	0.04
Chile	0.06	Malaysia	0.04	Korea	0.03	Great Britain	0.02	Brazil	0.04
Nigeria	0.06	Venezuela	0.04	Australia	0.03	Chile	0.02	Korea	0.03
Thailand	0.09	Taiwan	0.05	Zimbabwe	0.04	United States	0.02	Chile	0.03
Taiwan	0.12	Colombia	0.09	Great Britain	0.04	Switzerland	0.02	India	0.02
Greece	0.13	Argentina	0.14	Venezuela	0.09	Colombia	0.05	Portugal	0.02
Turkey	0.14	Indonesia	0.14	Nigeria	0.10	France	0.06	Malaysia	0.01
Jordan	0.16	Turkey	0.14	Greece	0.11	Philippines	0.07	Indonesia	-0.06
Venezuela	0.24	Pakistan	0.16	Thailand	0.12	Brazil	0.07		
Pakistan	0.25	Thailand	0.17	Jordan	0.14	Argentina	0.08		
Colombia	0.27	Greece	0.19	Turkey	0.16	Pakistan	0.08		
Argentina	0.43	Jordan	0.26	Argentina	0.32	Korea	0.09		
						Canada	0.09		
						Mexico	0.23		
Growth rates are the average annual growth rates. Indicator definitions are as given in Tables 1 and 2.									

Table 9: Growth rate of Stock Market Indexes, 1986-1993							
Growth of INDEX 1		Growth of INDEX 2		Growth of INDEX 3		Growth of INDEX 4	
Indonesia	7.15	Indonesia	5.33	Indonesia	5.43	Turkey	1.13
Turkey	1.51	Turkey	1.10	Turkey	1.10	Portugal	1.04
Portugal	1.37	Portugal	1.06	Portugal	1.09	Venezuela	0.98
Venezuela	1.30	Venezuela	0.97	Venezuela	0.92	Greece	0.86
Greece	1.15	Greece	0.81	Greece	0.83	Argentina	0.54
Austria	0.92	Argentina	0.52	Malaysia	0.52	Malaysia	0.53
Argentina	0.74	Malaysia	0.50	Argentina	0.45	Thailand	0.37
Malaysia	0.68	Mexico	0.32	Thailand	0.32	Philippines	0.26
Israel	0.52	Thailand	0.30	Mexico	0.30	Jordan	0.25
Belgium	0.52	Philippines	0.27	Philippines	0.28	Zimbabwe	0.23
Netherlands	0.51	Zimbabwe	0.22	Zimbabwe	0.21	Mexico	0.22
Thailand	0.46	Colombia	0.21	Jordan	0.19	Colombia	0.22
Norway	0.39	Jordan	0.17	Korea	0.17	Korea	0.15
Mexico	0.37	Korea	0.17	Colombia	0.17	Germany	0.14
Philippines	0.37	Brazil	0.14	Brazil	0.12	Pakistan	0.13
Denmark	0.33	India	0.12	India	0.10	Brazil	0.12
Jordan	0.31	Pakistan	0.11	Chile	0.09	Chile	0.10
Colombia	0.31	Chile	0.11	Pakistan	0.08	India	0.10
Zimbabwe	0.29	Great Britain	0.09	Great Britain	0.08	Switzerland	0.10
Singapore	0.27	Nigeria	0.08	Nigeria	0.06	Nigeria	0.08
Korea	0.23	Australia	0.04	Australia	0.04	Great Britain	0.08
Hong Kong	0.20	United States	0.03	United States	0.02	France	0.04
Pakistan	0.20	Japan	-0.03	Japan	-0.04	United States	0.02
Brazil	0.18					Canada	-0.01
Germany	0.17					Japan	-0.03
Chile	0.14						
Switzerland	0.14						
Finland	0.14						
India	0.14						
Great Britain	0.11						
Nigeria	0.11						
South Africa	0.09						
New Zealand	0.09						
France	0.07						
Spain	0.06						
Australia	0.05						
United States	0.03						
Canada	0.02						
Sweden	0.01						
Italy	-0.03						
Japan	-0.07						

Table 9 (continued): Growth rate of Stock Market Indexes, 1986-1993					
Growth of INDEX 2A		Growth of INDEX 3A			
Indonesia	5.33	Indonesia	5.43		
Turkey	1.10	Turkey	1.10		
Portugal	1.06	Portugal	1.09		
Venezuela	0.97	Austria	0.92		
Austria	0.92	Venezuela	0.92		
Greece	0.81	Greece	0.83		
Argentina	0.52	Belgium	0.52		
Belgium	0.52	Israel	0.52		
Israel	0.52	Malaysia	0.52		
Netherlands	0.51	Netherlands	0.51		
Malaysia	0.50	Argentina	0.45		
Norway	0.39	Norway	0.39		
Denmark	0.33	Denmark	0.33		
Mexico -	0.32	Thailand	0.32		
Thailand	0.30	Mexico	0.30		
Philippines	0.27	Philippines	0.28		
Singapore	0.27	Singapore	0.27		
Zimbabwe	0.22	Zimbabwe	0.21		
Colombia	0.21	Honk Kong	0.20		
Honk Kong	0.20	Jordan	0.19		
Germany	0.17	Colombia	0.17		
Jordan	0.17	Germany	0.17		
Korea	0.17	Korea	0.17		
Brazil	0.14	Switzerland	0.14		
Switzerland	0.14	Finland	0.14		
Finland	0.14	Brazil	0.12		
India	0.12	India	0.10		
Chile	0.11	Chile	0.09		
Pakistan	0.11	New Zealand	0.09		
Great Britain	0.09	South Africa	0.09		
New Zealand	0.09	Great Britain	0.08		
South Africa	0.09	Pakistan	0.08		
Nigeria	0.08	France	0.07		
France	0.07	Spain	0.06		
Spain	0.06	Nigeria	0.06		
Australia	0.04	Australia	0.04		
United States	0.03	Canada	0.02		
Canada	0.02	United States	0.02		
Sweden	0.01	Sweden	0.01		
Italy	-0.03	Italy	-0.03		
Japan	-0.03	Japan	-0.04		
Growth rate of indexes are obtained by averaging the growth rates of different stock market indicators depending on the index. Indexes are as defined in Table 6.					

Table 10 : Correlations of Initial Stock Market Development and Growth of the Stock Market, 1986-1993

			INITIAL DEVELOPMENT				
	Market Capitalization	Total Value Traded	Turnover	Volatility	Mis-Pricing ICAPM	Mis-Pricing APT	Mis-Pricing DCAPM
GROWTH							
Growth	-0.47	-0.41	-0.25	0.59	0.59	0.41	-0.03
Market	*0.00*	*0.01*	*0.12*	*0.00*	*0.01*	*0.07*	*0.90*
Capitalization	*41*	*40*	*40*	*32*	*20*	*20*	*20*
Growth	-0.25	-0.23	-0.28	0.22	0.09	0.17	-0.27
Value	*0.12*	*0.16*	*0.08*	*0.23*	*0.72*	*0.47*	*0.26*
Traded	*41*	*40*	*40*	*32*	*20*	*20*	*20*
Growth	-0.09	-0.17	-0.33	-0.17	-0.06	-0.02	-0.38
Turnover	*0.59*	*0.30*	*0.03*	*0.34*	*0.81*	*0.94*	*0.09*
	41	*40*	*42*	*32*	*21*	*21*	*21*
Growth	-0.28	-0.18	-0.25	0.08	0.15	0.22	-0.07
Volatility	*0.11*	*0.31*	*0.14*	*0.65*	*0.52*	*0.34*	*0.78*
	35	*34*	*35*	*33*	*20*	*20*	*20*
Growth	-0.22	-0.24	-0.13	0.38	0.47	-0.01	-0.26
ICAPM	*0.32*	*0.27*	*0.55*	*0.12*	*0.03*	*0.98*	*0.25*
Mis-Pricing	*23*	*23*	*24*	*18*	*21*	*21*	*21*
Growth	-0.24	-0.39	-0.37	0.05	-0.02	-0.47	-0.57
APT	*0.28*	*0.07*	*0.07*	*0.86*	*0.95*	*0.03*	*0.01*
Mis-Pricing	*23*	*23*	*24*	*18*	*21*	*21*	*21*
Growth	-0.23	-0.31	-0.18	0.57	0.59	-0.20	-0.38
DCAPM	*0.29*	*0.14*	*0.41*	*0.01*	*0.00*	*0.39*	*0.09*
Mis-Pricing	*23*	*23*	*24*	*18*	*21*	*21*	*21*

Initial development is defined as the 1986 values of stock market indicators. The P-values and numbers of observations are given in italics.

Table 11: Financial Intermediary Indicators 1986-1993					
	M3/GDP		QLLY		PRIV/GDP
Hong Kong	3.91	Hong Kong	3.53	Switzerland	3.14
Japan	3.57	Japan	3.00	Japan	2.27
Switzerland	2.83	Switzerland	2.26	Great Britain	1.97
Jordan	2.40	Singapore	1.80	Taiwan	1.80
Taiwan	2.38	Malaysia	1.51	Germany	1.80
Luxembourg	2.36	Taiwan	1.49	France	1.77
Singapore	2.26	Austria	1.44	Singapore	1.64
Malaysia	1.89	Jordan	1.41	Finland	1.60
Austria	1.72	Greece	1.21	Netherlands	1.53
Netherlands	1.61	Israel	1.19	United States	1.42
Great Britain	1.59	Netherlands	1.16	Austria	1.36
Greece	1.54	Thailand	1.12	Malaysia	1.33
Italy	1.47	United States	0.99	Spain	1.31
Portugal	1.47	Canada	0.97	Norway	1.27
Spain	1.44	Germany	0.94	Jordan	1.24
France	1.36	Portugal	0.93	Australia	1.07
Germany	1.34	Great Britain	0.92	Israel	1.01
United States	1.33	Spain	0.90	Thailand	0.99
Thailand	1.31	Australia	0.89	Korea	0.99
Israel	1.30	France	0.87	Sweden	0.98
Canada	1.27	Finland	0.82	Denmark	0.98
Norway	1.26	Korea	0.78	Chile	0.93
Denmark	1.19	Italy	0.75	New Zealand	0.92
Australia	1.13	South Africa	0.72	Canada	0.86
Finland	1.10	Zimbabwe	0.70	Portugal	0.84
South Africa	1.06	Ireland	0.64	South Africa	0.74
New Zealand	1.03	Denmark	0.62	Italy	0.71
Zimbabwe	0.96	Chile	0.61	Indonesia	0.66
Korea	0.96	New Zealand	0.61	Belgium	0.61
Sweden	0.96	Norway	0.61	Pakistan	0.55
Belgium	0.94	India	0.57	Ireland	0.52
Ireland	0.88	Venezuela	0.55	India	0.51
India	0.87	Belgium	0.55	Greece	0.45
Venezuela	0.80	Philippines	0.48	Venezuela	0.40
Pakistan	0.79	Indonesia	0.44	Turkey	0.36
Chile	0.72	Turkey	0.41	Philippines	0.34
Indonesia	0.65	Mexico	0.29	Mexico	0.29
Philippines	0.63	Colombia	0.28	Brazil	0.29
Turkey	0.61	Pakistan	0.25	Argentina	0.26
Nigeria	0.48	Nigeria	0.23	Colombia	0.25
Colombia	0.47	Argentina	0.15	Zimbabwe	0.24
Mexico	0.42	Brazil	0.14	Nigeria	0.24
Brazil	0.26				
Argentina	0.23				
M/3GDP is the ratio of liquid liabilities to GDP. QLLY is the (M3-M1) to GDP.					
PRIV/GDP is the ratio of domestic credit to private sector to GDP.					

Table 11 (cont.): Financial Intermediary Indicators 1986-1993							
	BY/GDP		SPREAD		PNB/GDP		INPE/GDP
Switzerland	3.26	Switzerland	0.87	Sweden	0.89	Netherlands	1.08
Luxembourg	2.59	Canada	1.38	Singapore	0.84	Great Britain	0.92
Japan	2.58	Great Britain	1.82	Korea	0.55	United States	0.67
Austria	2.39	Luxembourg	2.31	United States	0.53	Sweden	0.56
Germany	2.16	Malaysia	2.68	Australia	0.45	Denmark	0.54
Taiwan	2.10	Korea	2.90	Canada	0.42	Canada	0.48
Israel	2.07	United States	3.00	Venezuela	0.40	Japan	0.43
France	2.00	India	3.00	Malaysia	0.39	Australia	0.35
Netherlands	1.97	Singapore	3.02	Italy	0.33	Finland	0.33
Great Britain	1.97	South Africa	3.20	France	0.28	Germany	0.33
Spain	1.89	Japan	3.31	Spain	0.24	France	0.20
Singapore	1.87	Finland	3.55	Finland	0.21	Korea	0.14
Malaysia	1.61	Thailand	3.60	Thailand	0.15	Singapore	0.11
Finland	1.60	Zimbabwe	3.90	Zimbabwe	0.13	Malaysia	0.10
Norway	1.57	Norway	4.21	Denmark	0.12	Spain	0.08
Jordan	1.52	Indonesia	4.23	Great Britain	0.08	Jordan	0.07
Portugal	1.49	New Zealand	4.49	Jordan	0.08	Italy	0.06
Sweden	1.41	Spain	4.59	Mexico	0.08	Colombia	0.03
Thailand	1.23	Nigeria	4.60	Nigeria	0.08	Mexico	0.02
Belgium	1.20	Philippines	5.04	Philippines	0.07	Philippines	0.01
Denmark	1.20	Ireland	5.10	Colombia	0.06	Thailand	0.01
Australia	1.19	Germany	5.15	Indonesia	0.02	Pakistan	0.00
New Zealand	1.10	Denmark	5.35	Pakistan	0.01		
Italy	1.01	Jordan	5.56	Turkey	0.01		
Korea	1.00	Sweden	5.68	Netherlands	0.00		
United States	0.99	Belgium	5.70				
Greece	0.95	Portugal	5.96				
Canada	0.93	Australia	6.28				
Chile	0.90	Netherlands	6.92				
Ireland	0.87	Chile	6.96				
South Africa	0.78	Greece	7.19				
Pakistan	0.70	Italy	7.34				
India	0.68	Colombia	9.70				
Indonesia	0.65	France	10.57				
Turkey	0.54	Mexico	13.76				
Brazil	0.51	Turkey	19.50				
Philippines	0.48	Israel	20.95				
Mexico	0.48	Argentina	45.28				
Zimbabwe	0.45						
Venezuela	0.45						
Argentina	0.37						
Nigeria	0.33						
BY/GDP is the ratio of the total claims of deposit banks to GDP. SPREAD is the difference between bank lending and borrowing rates. PNB/GDP is the assets of private non-bank institutions divided by GDP. INPE/GDP is the assets of private insurance and pension funds divided by GDP.							

Table 12: Correlations of Financial Intermediary Indicators

	M3/GDP	BY/GDP	PRIV/GDP	QLLY	PNB/GDP	INPE/GDP
M3/GDP	1.00	0.83	0.81	0.97	0.32	0.18
	0.00	*0.00*	*0.00*	*0.00*	*0.12*	*0.42*
	44	*43*	*42*	*42*	*25*	*22*
BY/GDP		1.00	0.93	0.81	0.29	0.41
		0.00	*0.00*	*0.00*	*0.16*	*0.06*
		43	*42*	*41*	*25*	*22*
PRIV/GDP			1.00	0.79	0.32	0.49
			0.00	*0.00*	*0.12*	*0.02*
			42	*41*	*25*	*22*
QLLY				1.00	0.58	0.19
				0.00	*0.00*	*0.40*
				42	*24*	*21*
PNB/GDP					1.00	0.04
					0.00	*0.86*
					25	*20*
INPE/GDP						1.00
						0.00
						22

P-values and number of observations are given in italics. Indicators are as defined in Table 11.

Table 13: Financial Intermediary Indexes 1986-93					
	FINDEX1		FINDEX2		FINDEX3
Hong Kong	1.45	Singapore	0.70	Switzerland	1.39
Japan	1.31	Sweden	0.67	Sweden	1.04
Taiwan	0.64	United States	0.59	Luxembourg	0.94
Singapore	0.56	Netherlands	0.53	Australia	0.75
Great Britain	0.45	Great Britain	0.53	Singapore	0.68
Jordan	0.42	Canada	0.27	Netherlands	0.65
Netherlands	0.34	Austria	0.23	Japan	0.62
France	0.31	Malaysia	0.10	United States	0.60
Germany	0.30	France	0.09	Great Britain	0.55
Malaysia	0.29	Finland	0.03	Israel	0.54
Australia	0.23	Korea	0.02	Tawian	0.51
United States	0.14	Denmark	-0.02	Austria	0.34
Finland	0.12	Spain	-0.15	Canada	0.32
Spain	0.11	Jordan	-0.16	Germany	0.31
Norway	0.03	Italy	-0.17	Norway	0.16
Thailand	-0.02	Thailand	-0.36	Portugal	0.11
Canada	-0.06	Pakistan	-0.72	Korea	0.08
Portugal	-0.06	Philippines	-0.73	France	0.06
Israel	-0.07	Mexico	-0.77	Denmark	0.01
Austria	-0.12	Colombia	-0.78	Finland	0.01
Denmark	-0.12			Malaysia	0.00
Italy	-0.13			Venezuela	-0.06
New Zealand	-0.20			Belgium	-0.06
Korea	-0.21			Spain	-0.14
Sweden	-0.21			New Zealand	-0.19
Greece	-0.23			Italy	-0.23
South Africa	-0.23			Greece	-0.30
Chile	-0.29			Chile	-0.32
Belgium	-0.35			Ireland	-0.36
India	-0.44			South Africa	-0.39
Ireland	-0.45			Jordan	-0.45
Indonesia	-0.46			Thailand	-0.48
Pakistan	-0.46			India	-0.48
Zimbabwe	-0.52			Brazil	-0.58
Venezuela	-0.52			Zimbabwe	-0.59
Turkey	-0.59			Indonesia	-0.72
Philippines	-0.61			Argentina	-0.72
Nigeria	-0.71			Nigeria	-0.72
Mexico	-0.71			Mexico	-0.77
Colombia	-0.72			Turkey	-0.78
Brazil	-0.75			Philippines	-0.78
Argentina	-0.79			Pakistan	-0.81
				Colombia	-0.82

FINDEX1 Financial intermediary index 1 is the average of M3/GDP and PRIV/GDP.FINDEX2 Financial intermediary index 2 is the average of M3/GDP, PRIV/GDP, Private nonbanks/GDP and Private Insurance and Pension/GDP. FINDEX3 Financial Intermediary Index 3 is the average BY/GDP, Private non-banks/GDP and Private Insurance and Pension/GDP. FINDEX does not include the last two terms if data are not available. Exact calculation of the indexes are discussed in the text. Definitions are as given in Table 11.

Table 14: Correlations Among Financial Intermediary Indexes			
	FINDEX1	**FINDEX2**	**FINDEX3**
FINDEX1	1.00	0.74	0.78
	0.00	*0.00*	*0.00*
	42	*20*	*42*
FINDEX2		1.00	0.98
		0.00	*0.00*
		20	*20*
FINDEX3			1.00
			0.00
			43

P-values and number of observations are given in italics. Indexes are as defined in Table 13.

Table 15: Correlations between financial intermediary indicators and stock market indicators.						
	M3/GDP	BY/GDP	PRIV/GDP	QLLY	PNB/GDP	INPE/GDP
Market	0.66	0.40	0.52	0.67	0.47	0.29
Capitalization	*0.00*	*0.01*	*0.00*	*0.00*	*0.02*	*0.20*
	41	*40*	*40*	*40*	*25*	*22*
Total Value	0.75	0.58	0.70	0.78	0.46	0.33
Traded	*0.00*	*0.00*	*0.00*	*0.00*	*0.02*	*0.14*
	41	*40*	*40*	*40*	*25*	*22*
Turnover	0.18	0.42	0.38	0.22	0.27	0.11
	0.25	*0.01*	*0.01*	*0.16*	*0.20*	*0.61*
	41	*40*	*40*	*40*	*25*	*22*
APT mispricing	-0.49	-0.48	-0.54	-0.45	-0.06	-0.40
	0.01	*0.02*	*0.01*	*0.03*	*0.84*	*0.20*
	24	*24*	*24*	*24*	*16*	*12*
ICAPM mispricing	-0.51	-0.47	-0.55	-0.46	-0.23	-0.38
	0.01	*0.02*	*0.01*	*0.02*	*0.39*	*0.22*
	24	*24*	*24*	*24*	*16*	*12*
Volatility	-0.41	-0.42	-0.40	-0.37	-0.12	-0.52
	0.0121	*0.01*	*0.01*	*0.03*	*0.60*	*0.02*
	37	*37*	*37*	*36*	*21*	*20*
Market	-0.24	-0.28	-0.32	-0.24	-0.42	-0.56
Concentration	*0.24*	*0.16*	*0.11*	*0.23*	*0.11*	*0.04*
	26	*26*	*26*	*26*	*16*	*14*
Institutional	-0.05	0.21	0.26	0.04	0.42	0.51
Indicator	*0.84*	*0.37*	*0.27*	*0.86*	*0.15*	*0.20*
	20	*20*	*20*	*20*	*13*	*8*

P values and number of observations are given in italics. Financial intermediary indicators are defined in Table 11 and stock market indicators are defined in Tables 1 and 2.

Table 16: Rank Correlations Between Financial Intermediary Indicators and Stock Market Indicators

	M3/GDP	BY/GDP	PRIV/GDP	QLLY	PNB/GDP	INPE/GDP
Market	0.61	0.54	0.67	0.66	0.52	0.53
Capitalization	*0.00*	*0.00*	*0.00*	*0.00*	*0.01*	*0.01*
	41	*40*	*40*	*40*	*25*	*22*
Total Value	0.66	0.70	0.81	0.72	0.53	0.48
Traded	*0.00*	*0.00*	*0.00*	*0.00*	*0.01*	*0.02*
	41	*40*	*40*	*40*	*25*	*22*
Turnover	0.32	0.49	0.52	0.38	0.32	0.27
	0.04	*0.00*	*0.00*	*0.01*	*0.12*	*0.22*
	41	*40*	*40*	*40*	*25*	*22*
APT mispricing	-0.50	-0.50	-0.55	-0.39	-0.08	-0.28
	0.01	*0.01*	*0.01*	*0.06*	*0.77*	*0.38*
	24	*24*	*24*	*24*	*16*	*12*
ICAPM mispricing	-0.57	-0.54	-0.66	-0.46	-0.18	-0.24
	0.00	*0.01*	*0.00*	*0.02*	*0.51*	*0.44*
	24	*24*	*24*	*24*	*16*	*12*
Volatility	-0.50	-0.50	-0.53	-0.42	-0.03	-0.49
	0.00	*0.00*	*0.00*	*0.01*	*0.91*	*0.03*
	37	*37*	*37*	*36*	*21*	*20*
Market	-0.27	-0.42	-0.44	-0.23	-0.37	-0.53
Concentration	*0.18*	*0.03*	*0.02*	*0.26*	*0.16*	*0.05*
	26	*26*	*26*	*26*	*16*	*14*
Institutional	-0.06	0.31	0.33	0.10	0.36	0.49
Indicator	*0.82*	*0.18*	*0.15*	*0.67*	*0.22*	*0.22*
	20	*20*	*20*	*20*	*13*	*8*

P values and number of observations are given in italics. Financial intermediary indicators are as defined in Table 11 and stock market indicators are defined in Tables 1 and 2.

Table 17: Correlations Between financial intermediary and stock market indexes

	INDEX1	INDEX2	INDEX3	INDEX4	INDEX2A	INDEX3A
FINDEX1	0.72	0.83	0.84	0.81	0.72	0.73
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	40	*23*	*23*	*21*	*40*	*40*
FINDEX2	0.67	0.80	0.80	0.92	0.66	0.65
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	20	*11*	*11*	*10*	*20*	*20*
FINDEX3	0.62	0.79	0.79	0.80	0.61	0.61
	0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
	40	*23*	*23*	*21*	*40*	*40*

P-values and number of observations are given in italics. Indexes include indicators as defined in Table 6 and 13. Exact calculations of the indexes are given in the text.

Table 18: Correlations of Stock Market and Financial Intermediary Inefficiency, 1986-1993				
	Spread	APT Mis-Pricing	DCAPM Mis-Pricing	ICAPM Mis-Pricing
Spread	1	0.2	0.48	0.81
	0	*0.39*	*0.03*	*0*
	39	*21*	*21*	*21*
APT Mis-Pricing		1	0.68	0.68
		0	*0*	*0*
		24	*24*	*24*
DCAPM Mis-Pricing			1	0.75
			0	*0*
			24	*24*
ICAPM Mis-Pricing				1
				0
				24
P-values and number of observations are given in italics.				
Spread is the difference between bank lending and borrowing rates.				

Figure 1

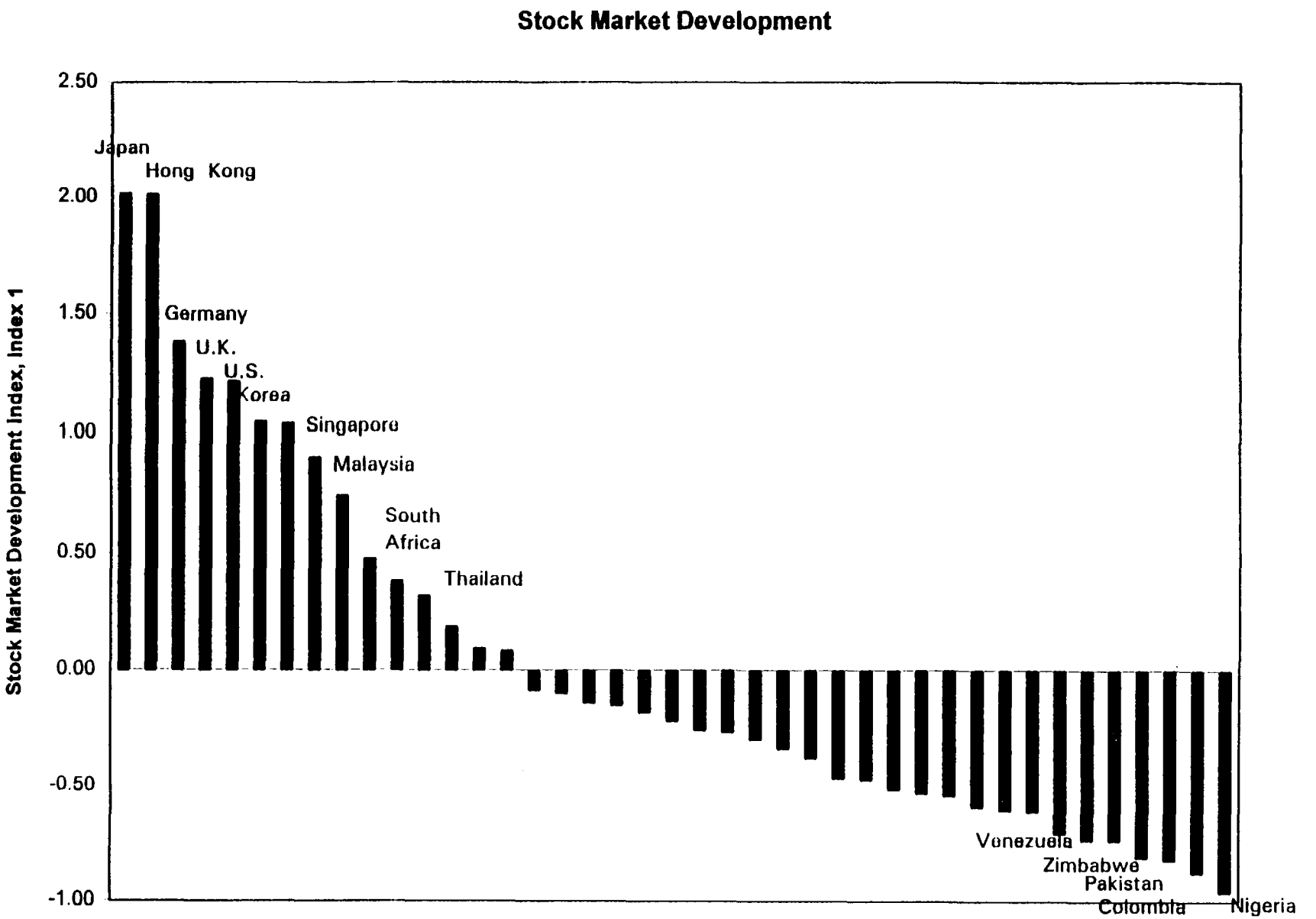

Stock Market Development
Stock Market Development Index, Index 1
2.50
2.00
1.50
1.00
0.50
0.00
-0.50
-1.00
Japan
Hong Kong
Germany
U.K.
U.S.
Korea
Singapore
Malaysia
South Africa
Thailand
Venezuela
Zimbabwe
Pakistan
Colombia
Nigeria

Figure 2

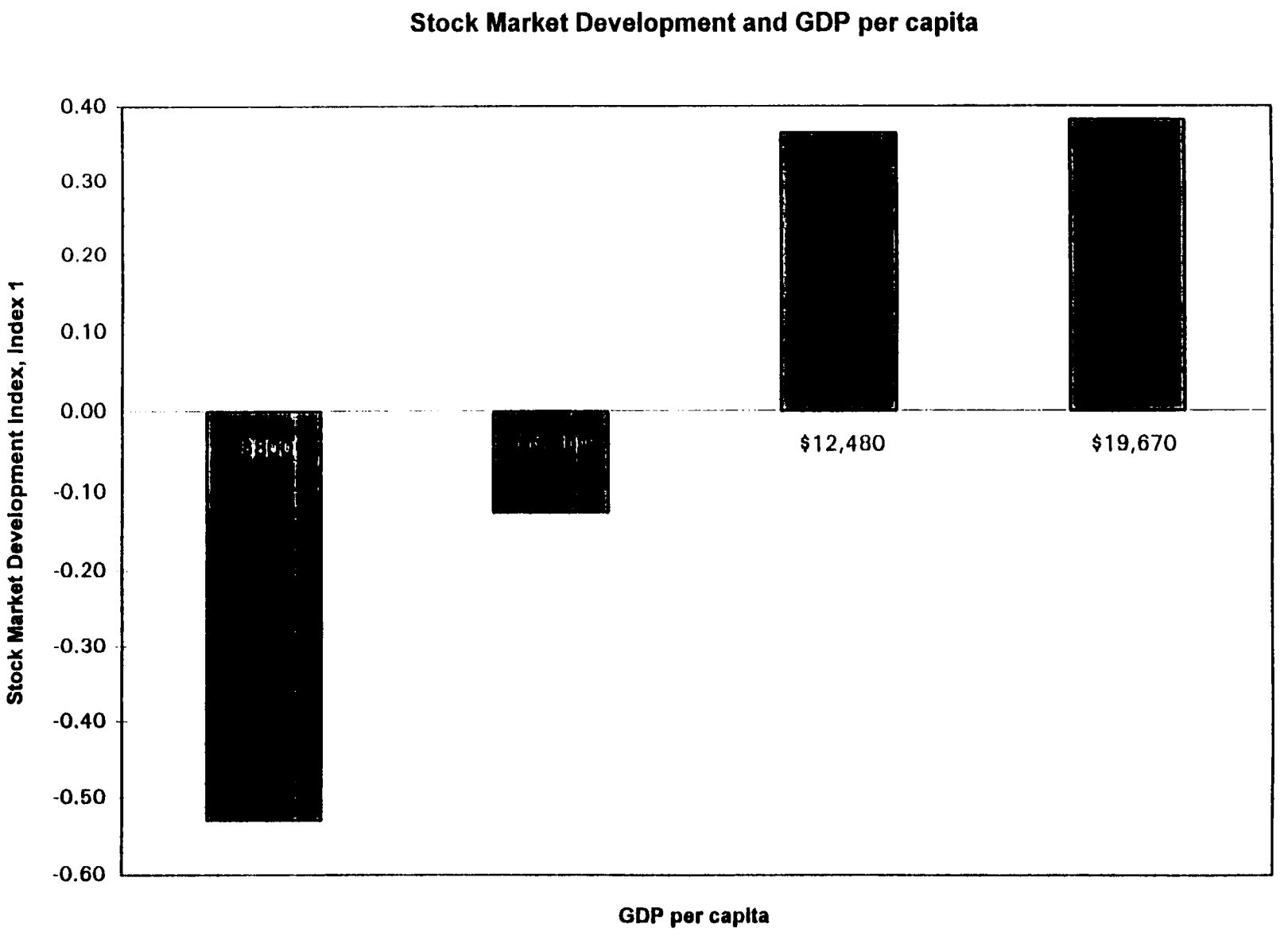

Stock Market Development and GDP per capita
0.40
0.30
0.20
0.10
0.00
-0.10
-0.20
-0.30
-0.40
-0.50
-0.60
Stock Market Development Index, Index 1
$12,480
$19,670
GDP per capita

Figure 3

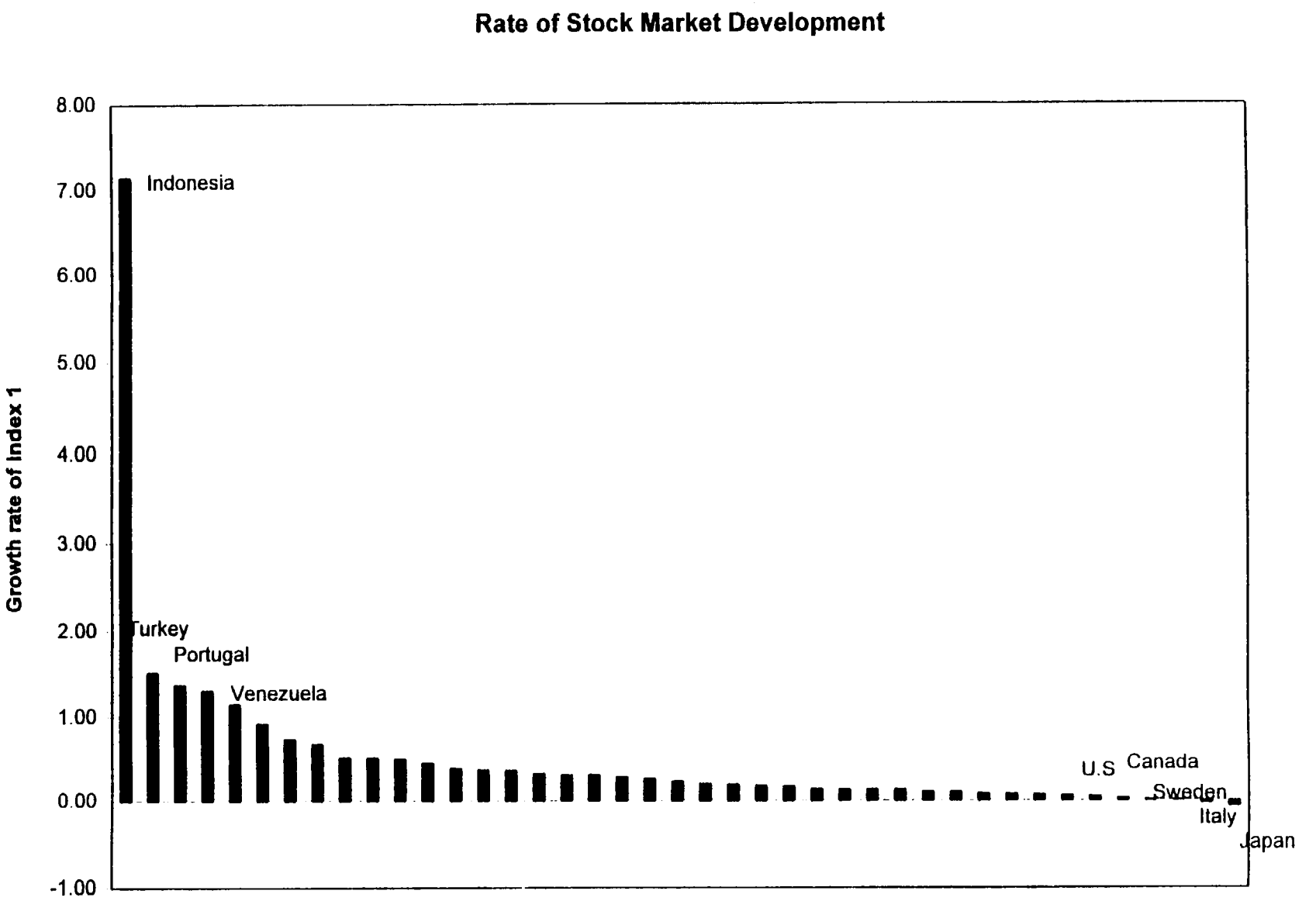
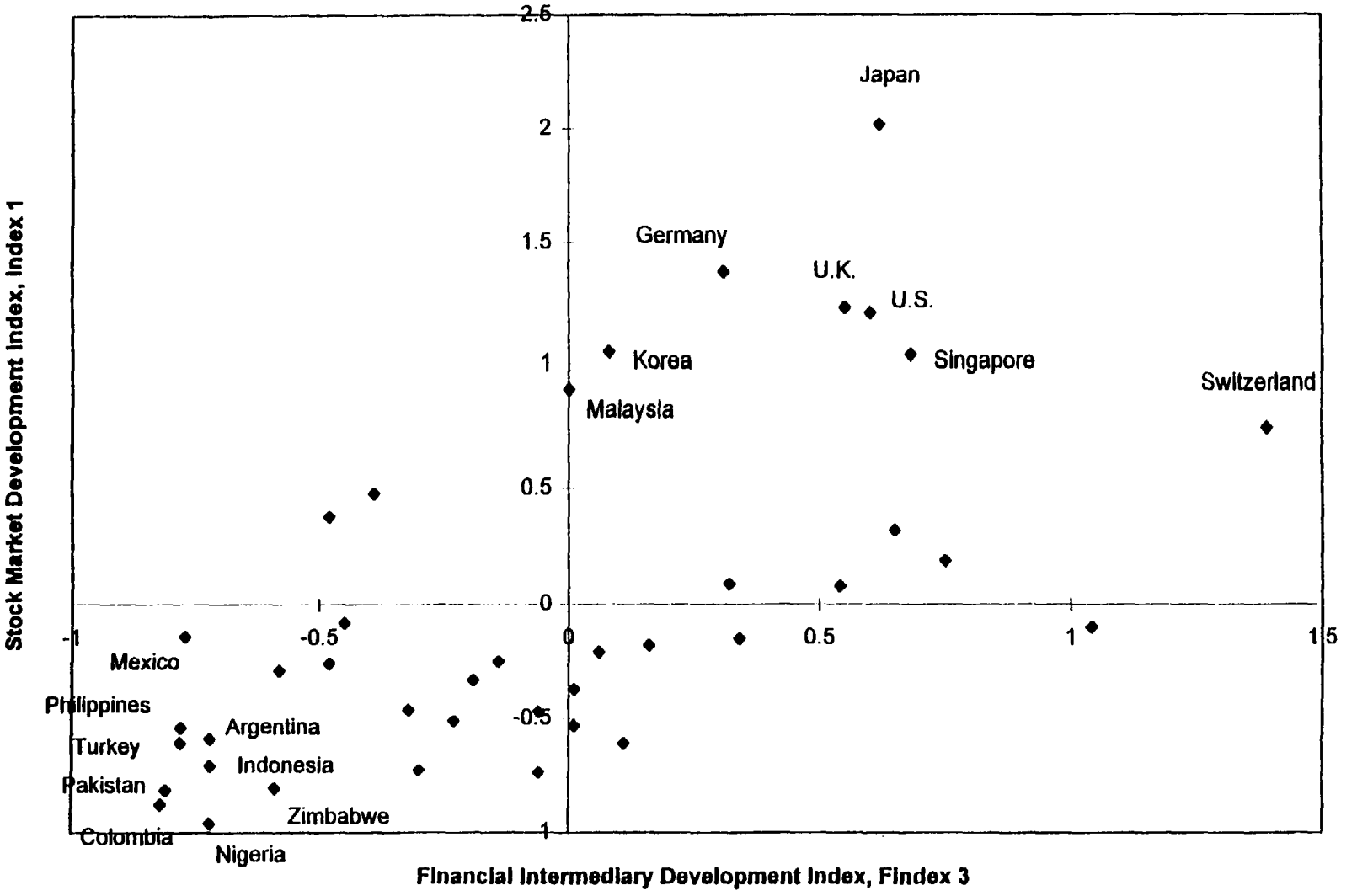

Rate of Stock Market Development
Growth rate of Index 1
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
Indonesia
Turkey
Portugal
Venezuela
U.S
Canada
Sweden
Italy
Japan

Figure 4

Stock Market and Financial Intermediary Development



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