Emerging Equity Markets in the Global Economy

by John Mullin

Developing-country equity markets have undergone great changes in recent years. International investors have purchased emerging-market equity shares at unprecedented rates, tripling the value of their emerging-market equity portfolios between 1989 and 1992. Greater foreign investment in emerging markets has tightened their price linkages to the international financial centers. Partly as a result of these changes, emerging markets have matured considerably, achieving increased market size and an increased capacity to support equity issuance.[1]

Much of the attraction of developing-economy equity markets derives from the outstanding return performances registered by many of these markets in recent years. Between 1976-92, annualized equity returns exceeded 20 percent in Argentina, Chile, Mexico, South Korea, and Thailand. Equity returns in Chile and Mexico soared to almost 50 percent per year during 1990-92.

This article seeks to explain these striking emerging-market return performances. It examines recent structural reforms and their effects on equity portfolio inflows in nine of the most highly capitalized emerging markets: Argentina, Brazil, Chile, Mexico, South Korea, Taiwan, Malaysia, Thailand, and India.[2] The article also charts broad trends in developing-country equity markets, giving attention to the integration of these markets with the global financial system, analyzing how these markets have become more like developed-country markets, and identifying the substantial differences that remain. Finally, the article evaluates the effects of increased integration on the potential diversification gains that these markets offer to international investors.

The analysis shows that across national markets, equity returns have borne a positive relationship to measures of economic performance, such as rates of export growth and dividend-per-share growth. Nevertheless, the extraordinary equity returns registered by several developing-country markets in recent years have exceeded levels that can be explained by measures of ex ante risk and ex post macroeconomic performance. Returns in these countries appear to reflect fundamental structural changes that have increased investor demand for developing-country equity shares.

Among these structural changes are measures designed to make it easier for international investors to buy and sell developing-country stocks. Officials in several developing countries have modified domestic accounting and underwriting regulations in successful efforts to make public equity offerings in the United States. In addition, market openings in Mexico, Brazil, and South Korea have clearly accelerated foreign equity portfolio investment in those markets.

Other structural changes contributing to the demand for emerging-market equity shares involve basic economic reforms. Far-reaching programs to stabilize exchange rates and prices have helped bring about the particularly large increases in equity portfolio inflows observed in some Latin American countries. Ambitious

[1] The International Finance Corporation considers all stock markets in developing countries to be "emerging." The World Bank defines developing countries as those with GNP per capita of less than $7,620 in 1990 (see International Finance Corporation, *Emerging Stock Markets Factbook*, 1992, p. 3).

[2] These countries represent the nine most highly capitalized markets tracked by the International Finance Corporation's Emerging Markets Data Base.

privatization programs in Argentina and Mexico have also increased equity portfolio inflows, both directly by increasing the supply of internationally marketable equity shares and indirectly by improving government fiscal balances and thereby promoting future macroeconomic stability.

Evidence of increased emerging-market integration with the global financial system is found in the joint movements of returns realized by investors in developing-country and developed-country equities. Historically, monthly return correlations between pairs of developed markets have most often exceeded those between emerging and developed markets. In recent years, however, monthly return correlations have tended to increase between developed markets and those developing-country markets that became more open to foreign investment during the past decade. Moreover, an examination of correlations at different frequencies reveals that many developing-country markets may have been even more closely integrated with the global financial system during the past decade than the monthly return correlations would suggest.

The article's review of trends in emerging markets suggests that structural changes and equity portfolio inflows have helped accelerate a decade-long movement toward greater stock market capitalization—that is, an increase in the value of emerging-market equity shares outstanding. By 1991, several emerging markets' ratios of capitalization to gross domestic product (GDP) had converged with those of the world's most mature equity markets. Rapid capitalization growth has been accompanied by a recent surge in developing-country equity issuance, which has been particularly pronounced in the rapidly growing economies of East Asia. Equity issuance in these countries has exceeded the post-World War II norm for Group of Seven (G-7) economies and has been roughly in line with the high rates of equity issuance experienced by the United States during the 1920s. These patterns of equity issuance support the hypothesis that equity issuance becomes a more important source of finance in the latter part of an economy's rapid-growth stage of economic development.

Although emerging equity markets have become more like developed-country markets in key ways, substantial differences remain. One important difference is that developing-economy equity markets generally lack breadth. In addition, many developing-country stock markets remain more volatile than their more developed counterparts. The evidence indicates that this return volatility tends to reflect the volatility of economic conditions, especially that of inflation rates and real exchange rate changes.

The final section of the article finds that the vast changes that have taken place in emerging markets over the past decade have important implications for international investors. Financial analysts often argue that developing-country stocks, though volatile, offer striking diversification benefits because their returns have historically been both impressive and relatively uncorrelated with developed-country equity returns. Because many developing markets have undergone important structural changes in recent years, however, the procedure of using historical return averages and correlations to calculate ex ante diversification strategies is particularly suspect.

Return performance: the allure of emerging equity markets

Much of the allure of developing-country equity markets stems from the outstanding return performances registered by many of these markets. For instance, the International Finance Corporation (IFC) total return indexes for Argentina and Chile both grew at annualized rates in excess of 30 percent between December 1975 and December 1992 (Chart 1).[3] During the same seventeen-year span, the IFC total return indexes for Mexico, South Korea, and Thailand increased at impressive annualized rates of 22 to 24 percent.

In comparison, developed-country return performances tended to be more modest. The world equity return index computed by Morgan Stanley Capital International (MSCI) grew at an annualized rate of 14 percent between December 1975 and December 1992.[4] During the same period, the New York Stock Exchange (NYSE) total return index computed by the Center for Research in Securities Prices (CRISP) appreciated at an annualized rate of 15 percent, while the MSCI Japan total return index appreciated at an annualized rate of 17 percent. Of the seven emerging markets for which sixteen years of IFC data are available, only Brazil's IFC index increased at a significantly lower rate (6 percent per year) than the return indexes of these developed-country markets.

Chart 1 also gives the cumulative annualized rates of return of the NYSE over consecutive sixteen-year intervals since 1802.[5] The exceptional nature of the recent return performances of the Argentine, Chilean, Mex-

[3]Throughout the paper, unless explicitly noted, returns are calculated in terms of U.S dollars Return indexes are constructed in such a manner that the percentage change of a market's return index equals the market's rate of return

[4]The Morgan Stanley Capital International index is almost exclusively composed of developed-country stocks.

[5]Data for 1802-25 were compiled originally by the Cowles Commission and subsequently adjusted by William Schwert in "Indexes of United States Stock Prices, 1802-1987," *Journal of Business*, July 1990

ican, Korean, Thai, and Taiwanese stock markets is underscored by the fact that annualized returns of the NYSE did not exceed 16 percent in any of these sixteen-year periods

Both developing-country and developed-country returns have been somewhat mixed in recent years. During 1990-92, three of the four Latin American markets under consideration—Argentina, Chile, and Mexico—had phenomenal annualized returns of between 30 and 50 percent In the same three-year period, however, Korea and Taiwan experienced asset price deflations. The experience of these two countries mirrored that of Japan, where the speculative stock market rally of 1987-89 set the stage for a subsequent period of asset price deflation Japan's tumbling share prices caused the MSCI world index to decline during the period, even though returns were positive in the United States and Europe.[6]

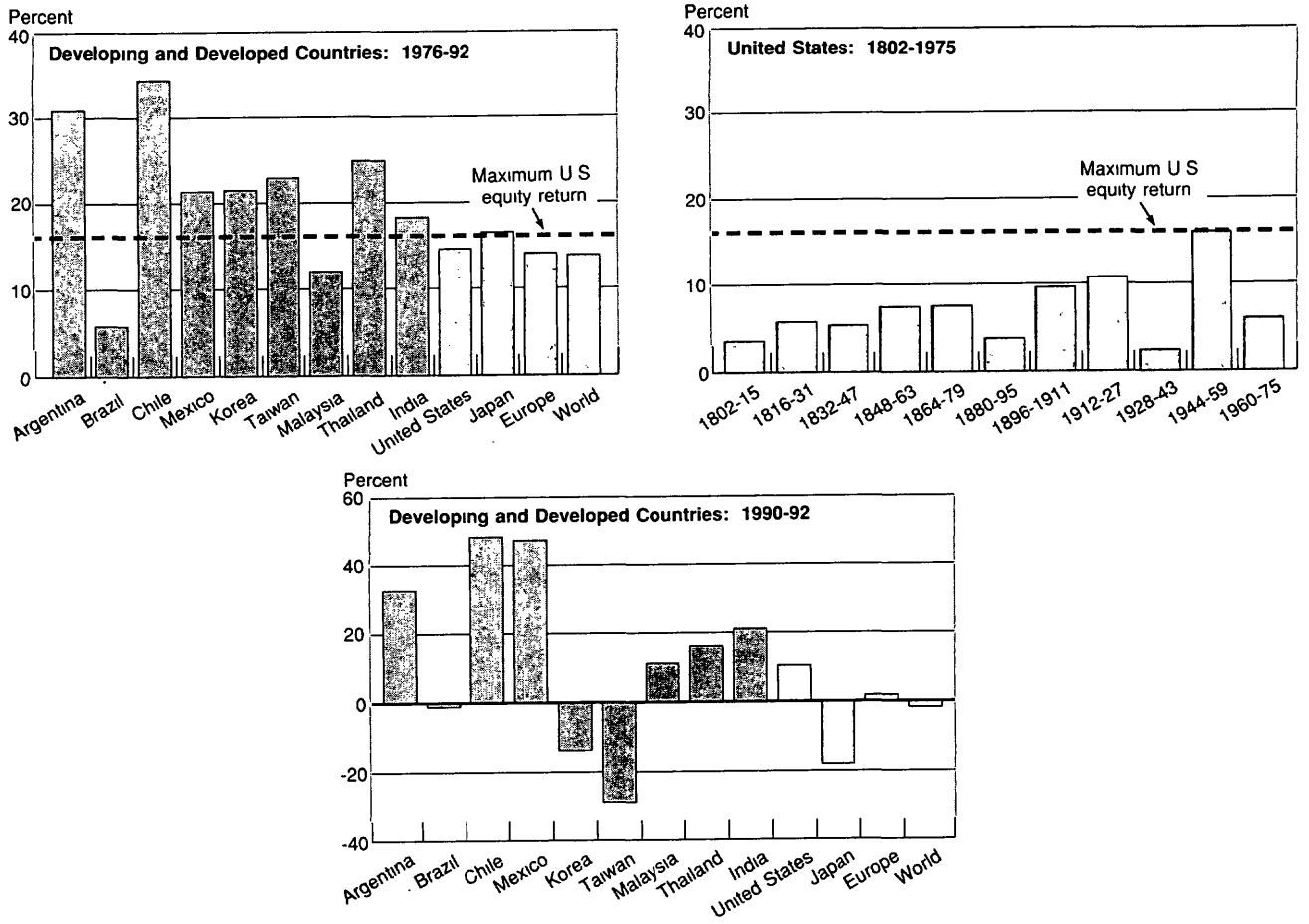
Stock returns and macroeconomic performance

Buying developing-country equity shares is often likened to taking a stake in the growth prospects of a

[6]World returns, as measured by the MSCI index, would have been higher (and perhaps positive) during the period had Japan's market capitalization been adjusted downward to take into account the effects of cross-holdings See Jack McDonald, "The Mochiai Effect Japanese Corporate Cross-Holding," *Journal of Portfolio Management*, Fall 1989, pp 90-94

Chart 1

Annualized Equity Returns



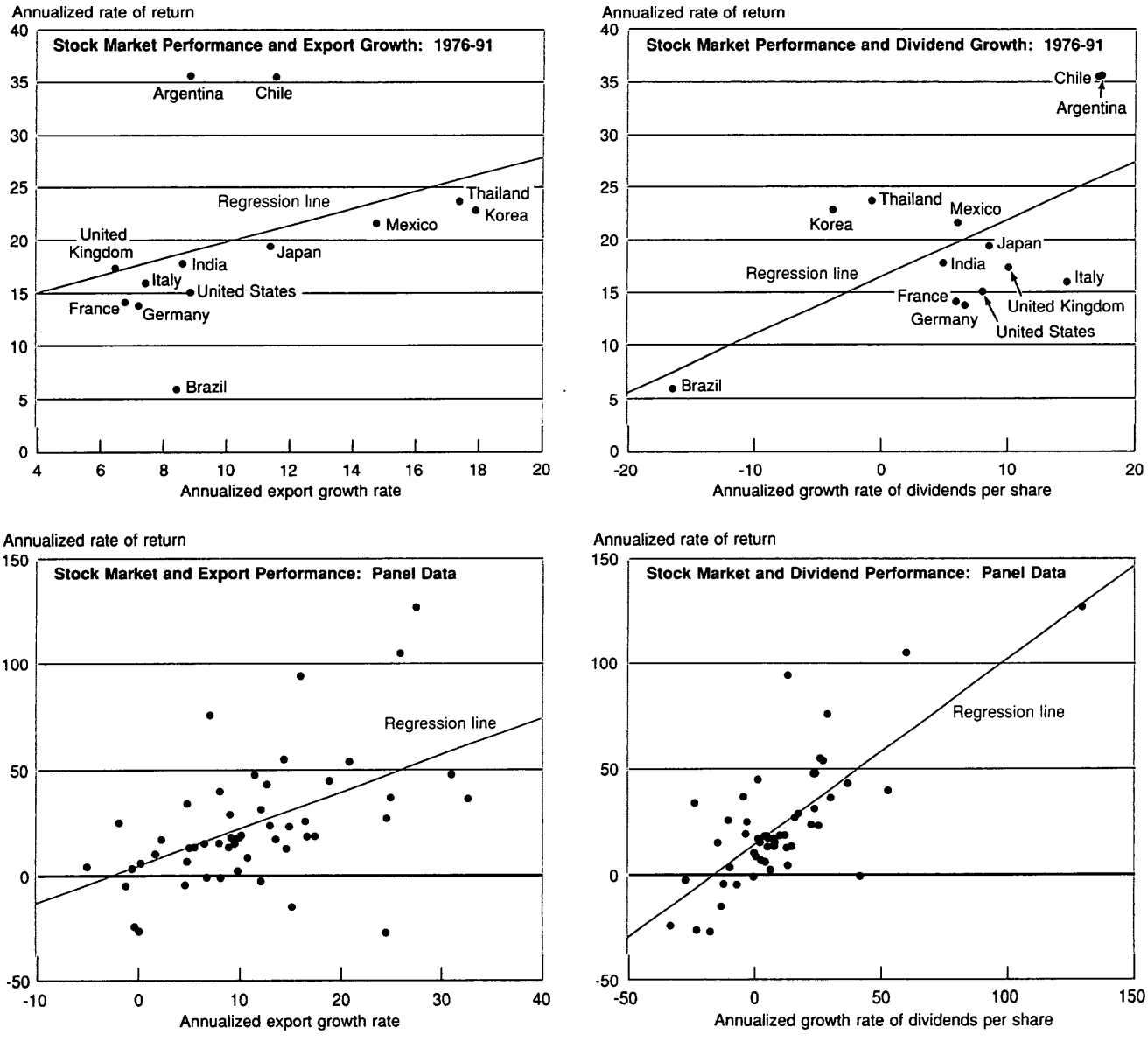
Sources International Finance Corporation, Center for Research in Securities Prices, Morgan Stanley Capital International, William Schwert, "Indexes of United States Stock Prices, 1802-1987," *Journal of Business*, July 1990

Notes Grey-shaded bars represent developing countries Data for Malaysia and Taiwan span 1985-92

developing country. While ex ante or expected equity returns should reflect risk considerations, ex post or actual returns should also reflect an economy's realized macroeconomic performance. For this reason, it seems puzzling that cumulative equity returns in Argentina were greater between 1975 and 1991 than equity returns in Japan, Korea, and Thailand. After all, Argentine output growth was lethargic during the period, while the Japanese, Korean, and Thai economies boomed. Should we not expect to find a positive cross-country

Chart 2

Macroeconomic Determinants of Cumulative Equity Returns



Sources: International Finance Corporation, Emerging Markets Data Base; Morgan Stanley Capital International; International Monetary Fund, International Financial Statistics; Bank for International Settlements.

correlation between cumulative equity returns and macroeconomic performance measures such as output and export growth rates? Should we not expect to see a negative relationship between equity returns and inflation? This section examines these questions and finds that cumulative equity returns are in fact correlated with various economic fundamentals. High returns among many developing countries stem partially from the robust growth that these economies have experienced over the past two decades Nevertheless, the outstanding return performances registered by several of these countries surpass levels that can be explained by measures of ex ante risk and ex post performance These return performances appear to reflect basic structural changes in the economies in question

Returns and export and output growth rates

Consider first the relationship between equity returns and one important economic fundamental, export growth rates. A simple cross-country scatter diagram (Chart 2) provides only mixed support for the hypothesis that 1976-91 export growth rates and equity returns are positively related. While three export superstars (Korea, Thailand, and Mexico) had annualized stock returns of between 21 and 24 percent, two countries with much more modest export performances (Argentina and Chile) registered equity returns in excess of 35 percent [7] The cross-country relationship appears much tighter, however, when three South American countries—Argentina, Brazil, and Chile—are excluded from the analysis

[7]Exports are measured in U S dollars

Table 1

Manufacturing's Share in the International Finance Corporation Index Relative to Its Share in GDP

Country	(A) Share in IFC Index (Percent)	(B) Share in GDP (Percent)	(A)/(B)
Argentina	44	22	2 0
Brazil	52	39	1 3
Chile	23	21	1 1
Mexico	35	25	1 4
South Korea	35	31	1 1
Taiwan	41	34	1 2
Malaysia	22	27	0 8
Thailand	33	26	1 3
India	97	19	5 1

Sources Capitalization data are International Finance Corporation estimates for end-1991, GDP composition data are Federal Reserve Bank of New York staff estimates for 1989

Stronger support for the hypothesis arises from an alternative way of assessing the relationship between equity returns and export growth rates. A panel-data scatter diagram, constructed by breaking each country's experience into four-year periods, indicates that the relationship between annualized returns and export growth rates is fairly tight. Regression analysis confirms that the panel-data relationship is statistically significant, whether or not dummy variables are included to take into account time-period and regional effects.

Corresponding tests of the relationship between output growth and equity returns reveal no statistically significant relationship between these two measures of performance The finding that the correlation between export performance and equity returns is greater than the correlation between output performance and equity returns is perhaps not surprising when one considers that, in general, the IFC indexes for the countries in question are disproportionately composed of stocks in the manufacturing (traded goods) sector (Table 1). Only in Malaysia does the share of manufacturing capitalization in the IFC index fall below the share of manufacturing output in GDP In most countries, and particularly in Argentina and India, the share of manufacturing capitalization in the IFC index overstates the share of manufacturing in GDP

Returns and growth rates of dividends per share

A fundamental that in theory should be closely related to equity performance is dividend-per-share growth.[8] A simple cross-country plot of equity returns against dividend-per-share growth in U.S. dollars indicates that dividend-per-share growth is positively correlated with equity returns. The countries with very high rates of dividend-per-share growth—Argentina and Chile—exhibit high rates of return, while Brazil, with a very low rate of dividend-per-share growth, experienced very low returns over 1976-91 This positive relationship between dividend-per-share and equity performance holds up in the panel-data diagram as well. Regression results indicate that 57 percent of the variation in equity returns can be explained by rates of dividend-per-share growth.

Returns and rates of inflation

The time-series evidence for the United States reveals a negative relationship between inflation and equity returns.[9] Surprisingly, perhaps, cross-country data indi-

[8]Merton Miller and Franco Modigliani, "Dividend Policy, Growth, and the Valuation of Shares," *Journal of Business*, vol 34 (1961), pp 411-33

[9]See Nai-Fu Chen, Richard Roll, and Stephen Ross, "Economic Forces and the Stock Market," *Journal of Business*, vol 59, no 3 (1986), pp 383-403 Strictly speaking, Chen, Roll, and Ross find a negative relationship between unexpected inflation and equity

cate no statistically significant relationship between equity returns and inflation rates. In part, this result reflects the very different equity performances of two high inflation countries: Brazil had very low annualized equity returns relative to other countries in the sample, while Argentina (with an even higher annualized rate of inflation) had extremely high equity returns (Chart 3) Like the cross-country data, the panel-data diagram does not indicate a negative relationship between equity returns and inflation

Overall, the data support the hypothesis that ex post equity returns are related to economic performance However, even a combination of measures of ex post performance and ex ante risk cannot adequately explain the outstanding equity returns registered by several emerging markets during the period of analysis In a cross-country regression of mean annual returns against cumulative export growth rates, cumulative dividend-per-share growth rates, and a commonly used measure of risk (beta), the fitted regression errors tend to be positive among the developing countries and negative among the developed countries [10] When a dummy variable for the developing economies is added to the equation, the dummy variable's estimated coefficient is positive and statistically significant (Table 2) A possible explanation of this finding is that high returns in several of the developing countries under examination reflect profound and largely unexpected changes in economic structure that have increased the demand for developing country stock and thereby increased share prices.

Structural reform and equity portfolio inflows

Structural reforms in developing countries have helped to accelerate foreign purchases of emerging-market stocks This section highlights some of the more important changes that have made this trend possible, including market openings in developing countries, efforts by developing-country officials to obtain listings for emerging market companies on the world's major stock exchanges, and policies designed to stabilize exchange rates and prices.

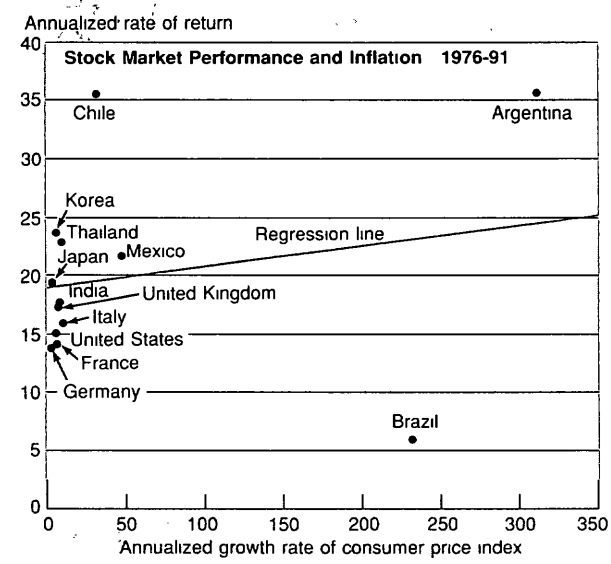
Emerging market equity shares have historically been underrepresented in international investment portfolios. At the end of 1989, the combined market capitalization of the world's emerging equity markets amounted to more than 5 percent of world equity market capitalization If international equity investors had held emerging

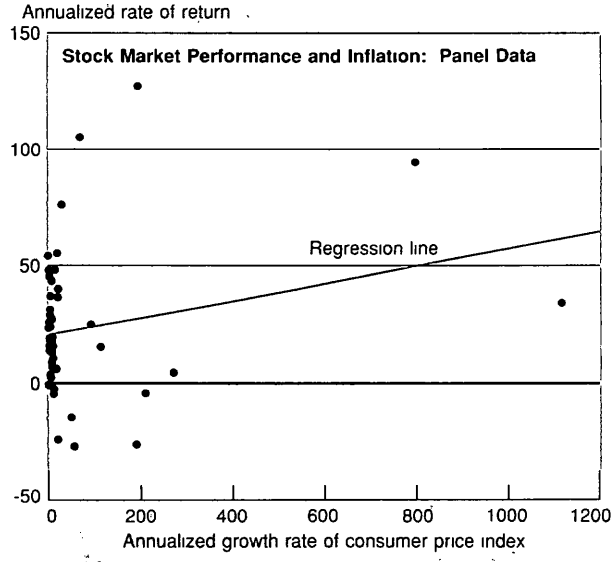
Footnote 9 continued
returns Given the substantial cross-sectional variation in the present data set and the lengthy time period of each observation (sixteen years per observation for the simple scatter diagrams and four years per observation for the panel-data diagrams), I assume that actual inflation rates are adequate proxies for unanticipated inflation rates

[10]Beta is defined as the ratio of (a) the covariance between an asset's excess return and the world excess return to (b) the variance of the world excess return The beta used in this exercise is based on annual data A discussion of beta and the distinction between betas based on annual data and betas based on monthly data is contained in Box 2

Chart 3

Inflation and Cumulative Equity Returns





Sources International Finance Corporation, Emerging Markets Data Base, Morgan Stanley Capital International, International Monetary Fund, International Financial Statistics

market shares in proportion to the markets' world capitalization weights, they would have devoted 5 percent of their funds to emerging market equity shares At the end of 1989, however, estimated foreign equity portfolio holdings of emerging market shares amounted to no more than $17 billion, or 0 2 percent, of the roughly $7 trillion in funds controlled by institutional investors in the major industrialized countries.[11]

Since 1989, a rapid acceleration of net foreign purchases of developing-country equity shares has significantly increased the share of emerging market equity holdings in international portfolios. The World Bank estimates that during 1990-92, cumulative foreign equity portfolio inflows into emerging markets amounted to $19.5 billion.[12]

Reliable estimates of equity portfolio inflows are difficult to assemble, largely because only a handful of developing countries have compiled data on direct foreign purchases of shares on their stock exchanges Data supplied by four developing countries, however, indicate that the World Bank estimate may understate the level of equity portfolio inflows into emerging markets over the past three years (Table 3). Brazil, Mexico, South Korea, and Taiwan have each experienced rapid accelerations of equity portfolio inflows since 1989. For this group alone, cumulative equity portfolio inflows amounted to $19.9 billion during 1990-92

Equity portfolio inflows can be divided into three categories.

(a) international equity issuance, including both publicly offered and privately placed American depository receipts (ADRs);
(b) direct equity portfolio inflows· direct purchases in emerging stock markets by foreign institutions and individuals other than closed-end mutual funds;
(c) flows through country-specific and multicountry closed-end mutual funds

International equity issuance

A notable feature of the recent increase in equity portfolio investment in developing countries has been a large increase in international equity market placements by developing-economy companies The vast majority of these placements have taken the form of ADRs. An ADR is essentially a claim, issued by a U S. depository institution, to an underlying share of stock in a foreign-based company In what is essentially a custodial arrangement, the U S. depository institution backs the ADR by holding shares of the underlying stock on behalf of the owner of the ADR In exchange for a fee, the depository institution provides the service of converting dividend receipts denominated in a foreign currency into dollars and distributing them to ADR holders Owners of ADRs are entitled at any time to redeem their ADRs for shares of the underlying stock A particular advantage of the ADR instrument is that settlement of trades between U.S investors can be handled by the depository institution without recourse to the home equity market of the non-U S company that issued the equity In this way, the ADR mechanism avoids the risks and transaction costs associated with settlement and clearance in foreign markets

Developing-country companies can place ADRs in the United States by two means. The first is a public ADR offering To offer an ADR publicly in the United States, the company must obtain a listing on a U.S exchange—the NYSE, AMEX, or NASDAQ In several recent cases, developing-country officials have modified domestic accounting and underwriting regulations to help domestic companies obtain listings on United States exchanges and to make public equity place-

[11]See International Finance Corporation, *1991 Annual Report*, pp 10-12, and World Institute of Development Economics Research of the United Nations University, "Foreign Portfolio Investment in Emerging Equity Markets," March 1990, pp 12-13

[12]See *1992-93 World Debt Tables*, vol 1 Analysis and Summary Tables, p 114 One reason that the World Bank estimate may be low is that it does not include Taiwan (although the IFC does include Taiwan in its emerging markets data base)

Table 2
Equations for Mean Annual Excess Return: 1976-91

Variable	Coefficient			
	Regression 1		Regression 2	
Constant term	−16 0	(15 1)	−17 8	(9 5)
Beta	13 2	(6.9)	13 5	(6 4)
Growth rate of dividends per share	1 0	(0 4)	1 0	(0 4)
Growth rate of exports	− 2	(1 1)	—	—
Dummy variable to control for emerging markets	28 2	(8 7)	27 5	(6 7)
Statistics				
n	13		13	
R^2	76		76	
Adjusted R^2	64		68	

Notes Standard errors are given in parentheses Sample includes six developed countries (France, Germany, Italy, Japan, the United Kingdom, and the United States) and seven developing countries (Argentina, Brazil, Chile, Mexico, South Korea, Thailand, and India)

ments in the United States In the case of the May 1991 public offering of ADRs by Telemex (the Mexican telephone company), the U.S Securities and Exchange Commission worked closely with Mexican officials to facilitate the offering, granting several technical exemptions to S.E C underwriting rules [13]

Private placements have been a second means of issuing developing-country ADRs in international markets. During 1990-92, private ADR placements by developing-country companies were four times as numerous as public offerings [14] Private ADR placements by developing-country companies received stimulus from the June 1990 adoption of Rule 144A by the U S Securities and Exchange Commission Rule 144A exempts qualified institutional buyers—institutions that own and invest on a discretionary basis at least $100 million in securities—from a rule that previously required them to hold privately placed securities for two years before trading them.[15] The adoption of Rule 144A increased the liquidity of privately placed developing-country ADRs and thus enhanced the attractiveness of these securities.

Before 1990, international equity placements by developing country companies were quite rare In 1990, Compania de Telefonos de Chile became the first Latin American company to list ADRs on the NYSE The successful $1 2 billion Telemex offering of May 1991, however, marked a watershed for developing countries. International equity placements by developing-country companies increased from an estimated $1 2 billion in 1990 to an estimated $9 billion in 1992 As a result, the share of total international equity issuance attributable to developing-economy companies increased from an estimated 15 percent in 1990 to an estimated 40 percent during 1992 [16]

A breakdown of international depository receipt issuance for seven emerging markets is given in Table 3.

[13]See Edward Greene, "Cross-Border Equity Offerings A Discussion of Some of the Critical Issues," Cleary, Gottlieb, Steen & Hamilton Working Paper, 1991

[14]Citibank ADR data indicate that during 1990-92, there were thirty-eight private ADR placements by developing-country companies and only eight public offerings

[15]See SEC Release No 33-6862 "Resale of Restricted Securities, Changes in Method of Determining Holding Period of Restricted Securities Under Rules 144 and 145 "

[16]IMF staff estimates of international equity issuance Totals include Singapore, Hong Kong, and Israel These countries' equity markets are categorized as developed, not emerging, by the IFC

Table 3

Equity Portfolio Inflows: 1990-92

Millions of U S Dollars

	1990	1991	1992	1990-92
Total equity portfolio inflows				
Brazil	100	600	1,800	2,500
Mexico	1,300	6,300	6,000	13,600
South Korea	500	300	2,100	2,900
Taiwan	100	200	500	800
Total for four	2,000	7,500	10,500	19,900
American depository receipt placements				
Argentina	0	400	400	700
Brazil	0	0	100	100
Chile	100	0	100	200
Mexico	0	3,000	3,300	6,300
South Korea	0	200	200	400
Taiwan	0	0	500	500
India	0	0	200	200
Direct equity portfolio inflows				
Brazil	100	600	1,600	2,300
Mexico	1,100	3,200	2,700	7,000
South Korea	0	0	1,800	1,800
Taiwan	100	200	100	300

Sources Citibank ADR Department, Federal Reserve Bank of New York staff estimates, author's communications with Bolsa Mexicana de Valores, Central Bank of Brazil, Korean Stock Exchange, and Taiwan Stock Exchange Corporation

Notes Equity portfolio inflows can be decomposed into three parts: (1) international placements, including ADR placements, (2) direct equity portfolio inflows, and (3) inflows through closed-end country funds Components may not add to totals because of rounding

Mexico has clearly been the dominant issuer of ADRs among developing countries, having raised $6.3 billion in international offerings during the past two years Issuance of Telemex ADRs accounted for $2 4 billion of this total By 1992, Telemex ADRs had become the most actively traded issue on the NYSE in terms of dollar volume. The dollar volume of trading in Telemex ADRs on the NYSE exceeded $23 billion during the year, compared with less than $16 billion for the second most actively traded ADR, the British pharmaceutical company Glaxo Holdings [17]

Direct equity portfolio inflows

Direct foreign purchases of equity shares have accelerated dramatically in three of the four countries for which data are available (Table 3). In Mexico, Brazil, and South Korea, rapid increases in direct foreign share purchases largely reflect the dismantling of capital-account restrictions and other impediments to direct foreign share purchases

In Mexico, the government implemented reforms in 1989 that permitted foreigners to purchase Mexican equities directly on the Bolsa (Table 4). At the same time, the Nafinsa Trust was established to allow foreigners to purchase "A" shares formerly restricted to Mexican nationals [18] In the three years following these

[17]Bank of New York, "Depository Receipts 1992 Market Review"

[18]"A" shares have full economic and corporate rights but can be directly owned only by Mexicans Foreigners can own these indirectly by holding certificates of ordinary participation issued by a Mexican trust The certificates convey full economic rights but no

Table 4

Liberalization of Restrictions on Foreign Access to Developing-Country Equity Markets

Country	Country Fund Admitted	Restrictions on Direct Equity Portfolio Purchases Liberalized	Repatriation Restrictions Liberalized	Recent Tax Rate Changes
Argentina	October 1991	July 1989 Prior approval of foreign portfolio investments is no longer required	October 1991 Required three-year holding period prior to repatriation of capital is eliminated	October 1991 Capital gains tax of 36% is removed
Brazil	September 1987	May 1991 Foreign institutional investors are allowed to buy stocks directly	1991 Required ninety-day holding period is eliminated	1991 Dividend tax and capital gains tax are lowered from 25% to 15%
Chile	October 1989	Foreign investment remains highly regulated because the government wishes to discourage short-term capital inflows	January 1992 Required holding period is lowered from three years to one year	Little change Capital gains tax of 35% is maintained to discourage large inflows
Mexico	June 1981	1989 Foreigners are permitted to buy shares directly on Bolsa	—	1990 Dividend tax of 40% is removed
Korea	November 1981	January 1992 Market is opened to direct foreign purchases, with foreign ownership of listed companies limited to 10%	—	—
Taiwan	October 1983	December 1990 Market is opened but foreign involvement is regulated extensively	Repatriation restrictions remain	—
Malaysia	May 1987	Relatively few restrictions on direct equity portfolio inflows exist	Capital and earnings may be freely repatriated	1990 Dividend tax of 35% is removed
Thailand	August 1985	April 1975 The Thai exchange has been open to foreign investment since its inception However, ceilings on foreign ownership in individual stocks (25%-49%) have limited foreign inflows	April 1991 Exchange control deregulation allows for easier repatriation of capital and earnings	1991 Capital gains tax of 25% is removed
India	July 1986	September 1992 Draft guidelines propose an easing of restrictions on foreign equity portfolio investment	—	1991 Capital gains and dividend tax rates are lowered

Sources *Euromoney Guide to World Equity Markets*, 1992, International Finance Corporation, *Emerging Stock Markets Factbook*, various issues, International Monetary Fund, *Exchange Arrangements and Restrictions*, various issues, various country sources

measures, cumulative direct foreign share purchases have amounted to $7 billion.

Two years after Mexico's market opening, Brazil followed suit Before May 1991, foreigners could only purchase Brazilian equity shares through closed-end funds or Brazilian investment companies Resolutions implemented in May 1991, however, allowed foreign institutional investors to buy stocks directly In addition, dividend and capital gains tax rates on foreign equity holdings were lowered from 25 percent to 15 percent, and a ninety-day minimum time period for the repatriation of investments by foreigners was abolished These liberalization measures contributed to an increase of direct foreign share purchases from $103 million in 1990 to $1 6 billion in 1992.

Argentina has also taken several steps in recent years to stimulate direct foreign equity purchases (Table 4). In 1989, the government eliminated the requirement that foreign portfolio investments receive prior approval Two years later, the government lowered the capital gains tax rate applicable to foreigners from 36 percent to zero and eliminated a requirement that investors observe a three-year holding period before repatriating capital. Unfortunately, however, it is not possible to gauge the effects of these recent liberalization measures on direct equity portfolio inflows into Argentina because data on these flows are not presently available.

Recent liberalization attempts across the Pacific have had mixed results The January 1992 opening of the Korean Stock Exchange induced a large flow of direct foreign purchases, which increased from zero in 1991 to $1.8 billion in 1992. Recent liberalization measures in Taiwan, however, have been partial and therefore less effective in stimulating direct equity portfolio inflows. Although the stock market was officially opened to direct foreign purchases in December 1990, remaining restrictions on access and the repatriation of cash dividends and capital gains discouraged potential investors Direct foreign share purchases accelerated in 1991 following Taiwan's market opening, but not to the extent that foreign purchases accelerated in Mexico, Brazil, or South Korea following those countries' market openings.

Whereas Korea and Taiwan have only recently made efforts to open their equity markets to direct foreign purchases, Thailand and Malaysia have maintained open equity markets since the mid-1980s. The relatively liberal policies of Thailand and Malaysia are reflected in data on foreign ownership presented in Table 5, which gives the percentages of equity owned by foreigners in three markets. Thailand, Malaysia, and Mexico. Whereas foreign ownership of Mexican stock did not come close to 20 percent until 1991, foreign ownership of stock in Thailand and Malaysia exceeded 20 percent at least several years earlier. These data indicate that the Thai and Malaysian markets have been fairly well integrated with the global financial system for some time

The evidence given in Table 4 indicates that by 1992, most of the developing countries under consideration had taken steps to encourage direct equity portfolio inflows Five countries—Mexico, Brazil, Taiwan, South Korea, and Argentina—have taken these steps quite recently, while two countries—Thailand and Malaysia—maintained relatively open markets throughout the latter half of the 1980s. In contrast, two countries—Chile and India—stand out as having taken few steps in recent years to dismantle restrictions that discourage direct equity portfolio inflows.

Equity portfolio inflows through closed-end funds

A large number of closed-end funds specializing in developing-country equity shares were established during the 1980s. The IFC promoted the establishment of these funds by advising developing countries on legal and regulatory frameworks and by underwriting and investing capital in these funds Since 1984, when the IFC helped establish the Korea Fund, the IFC has assisted in bringing twenty-five funds to the international market

During the mid-1980s, closed-end country funds were the primary and in some cases only available channel through which international portfolio investors purchased emerging market equity shares. Developing-country closed-end fund issuance peaked, however, in

Table 5
Foreign Equity Portfolio Ownership
Percent

	Thailand	Malaysia	Mexico
1985	20	—	—
1986	22	—	—
1987	27	28	—
1988	12	27	—
1989	12	27	4
1990	19	25	12
1991	17	22	19
1992	19	—	21

Sources Stock Exchange of Thailand, the Kuala Lumpur Stock Exchange, and the Bolsa Mexicana de Valores

Footnote 18 continued
voting rights Mexican "B" shares convey the same rights as "A" shares but can be owned by foreigners as well as Mexicans "N" and "L" shares can also be owned by foreigners, but "N" shares convey no voting rights and "L" shares convey only very limited corporate rights

1990 at $3 4 billion and then declined to $1.2 billion in 1991 [19] This decline stands in sharp contrast to the rapid rise of international placements and direct equity portfolio inflows during the same period. Apparently, the availability of these new means of acquiring developing-country equity shares dampened the demand for closed-end fund shares.

[19] IMF staff estimates

Latin American reform and equity portfolio investment

The acceleration of equity portfolio inflows into Latin America derives only in part from innovations that have made it easier for foreigners to buy shares of the region's companies The trend also owes much to the adoption of fundamental reforms in several of the region's economies. In 1987, following the lead of Chile, Mexico embarked on a stabilization program that has substantially reduced the government budget deficit

Box 1: United States Equity Portfolio Investment in Developing Countries

Treasury International Capital data indicate that United States net portfolio purchases of developing-country stocks reached record levels in recent years According to Table CM-V-5 of the *Treasury Bulletin*, net equity portfolio inflows from the United States into nine of the most highly capitalized developing-country equity markets increased to a cumulative $8 5 billion during 1990-92 from a cumulative $791 million during 1987-89 (see table)

Most of this dramatic increase is attributable to an increase in U S net purchases of Mexican and Brazilian equity shares During 1990-92, according to Treasury data, cumulative U S net purchases of Mexican stock amounted to $5 8 billion and cumulative U.S. net purchases of Brazilian stock amounted to $1.4 billion.

A comparison of the Treasury data with data provided by the central banks of Mexico and Brazil indicates that the U S share of total equity portfolio inflows into each of the two countries has been substantial in recent years The $5 8 billion Treasury figure for U S. net purchases of Mexican stock during 1990-92 equals 42 percent of the $13 6 billion in foreign net portfolio purchases of Mexican stock reported by the central bank of Mexico for the same period In the case of Brazil, the $1.4 billion Treasury figure for U S stock purchases equals 56 percent of the $2.5 billion figure for foreign net portfolio purchases of Brazilian stock reported by the central bank of Brazil.

Net Portfolio Equity Inflows from the United States

Millions of U S Dollars

	Cumulative Inflows					
	1984-86	1987-89	1990-92	1990	1991	1992
Argentina	7	−40	73	−3	64	12
Brazil	9	515	1,415	22	326	1,067
Chile	8	92	116	97	−74	93
Mexico	37	38	5,761	918	2,078	2,765
India	2	0	2	−1	3	0
Korea	64	−1	435	−31	0	466
Thailand	18	161	331	41	89	201
Malaysia	12	79	348	138	−25	235
Taiwan	10	−53	46	−6	38	14
Total	167	791	8,515	1,175	2,499	4,841

U.S. Share of Total Portfolio Equity Inflows: 1990-92

Percent

Brazil	56
Mexico	42
South Korea	14
Taiwan	5

Sources Treasury Bulletin, Table CM-V-5, various issues, country sources

while stabilizing the exchange rate and reducing the domestic rate of inflation. The government also undertook an ambitious privatization program that contributed to increased equity portfolio inflows directly by expanding the supply of internationally marketable equity shares, such as Telemex, and indirectly by widening the scope of the private sector in Mexico. In addition, prospects for a North American Free Trade Agreement between the United States, Canada, and Mexico boosted confidence in the sustainability of economic growth in Mexico and thereby stimulated portfolio investment. The successful completion of a Brady Plan debt reduction agreement between the country and its commercial bank creditors in March 1990 also increased confidence.

The Argentine government followed suit, embarking on an ambitious program in 1990 to divest itself of long-held industries. The government balanced its fiscal accounts and, in April 1991, pegged the peso to the dollar in order to reduce domestic inflation. As in Mexico, the successful completion of a commercial bank debt-restructuring agreement under the Brady Plan has buoyed investor confidence in the country.

Although equity inflows in recent years have typically come on the heels of significant changes in government policy, this has not always been the case. Brazil experienced large equity portfolio inflows in 1992 despite continuing high inflation and fiscal incoherence. To a certain extent, these flows reflect the liberalization of Brazilian restrictions on direct equity portfolio inflows. However, the flows also reflect investors' belief, in early 1992, that the prospects were fairly good for an improvement in Brazil's situation. By early 1992, the country had restructured its Paris Club debt, signed a stand-by agreement with the International Monetary Fund, and appeared to be moving toward a Brady Plan agreement with its commercial bank creditors. During the first half of 1992, direct equity portfolio inflows into Brazil amounted to $1.4 billion. As prospects for financial improvement dimmed in the summer of 1992, however, inflows dropped to $344 million during the second half of 1992.

Equity market integration and rate of return correlations

Structural changes that have encouraged equity portfolio flows into emerging markets have helped integrate these markets with the global financial system. As this process has unfolded, developing-country equity markets have assumed many of the behavioral traits of their more developed counterparts. A key trait of developed-economy equity markets is that their returns tend to move together; that is, when returns are higher than average on the NYSE, returns tend to be higher than average on the London Stock Exchange.[20] Also noteworthy is that the return correlations of developed-country equity markets tend to increase during periods in which world equity markets are particularly volatile.[21] The analysis in this section shows that in recent years developing-economy equity markets have increasingly exhibited each of these two traits: developing-country stock returns have become more closely correlated with the returns of the world's developed stock markets, and developing-country return correlations have tended to peak during periods of high world return volatility.

The analysis in this section also suggests that monthly return correlations may understate the actual degree of interconnectedness between developing-country and developed-country equity markets. Annual return correlations indicate that developed and developing markets may be more closely tied than is commonly thought.

Evolution of monthly return correlations

In recent years, equity returns in those developing countries that have opened their markets to foreign portfolio investment have become more closely correlated with the returns of developed nations. In seven of the nine developing-country markets under consideration, monthly return correlations with the MSCI world index were greater during 1990-92 than during 1985-89 (Chart 4). Five of these seven countries (Argentina, Brazil, Mexico, Korea, and Taiwan) have taken substantial steps in recent years to remove impediments to equity portfolio inflows, while two of the seven (Malaysia and Thailand) have maintained relatively open equity markets since the mid-1980s. In fact, only in India and Chile—two countries that have continued to maintain relatively tight restrictions on foreign investment—were correlation coefficients lower during 1990-92 than during 1985-89.

Evidence of a somewhat longer term trend toward behavioral convergence is found in an examination of monthly return correlations during periods in which world equity markets have displayed large price swings, that is, during periods in which rates of return have been highly volatile. Among developed-country equity markets, return correlations tend to increase during these periods of high return volatility. Rate-of-return evidence indicates that during the latter 1980s, this pattern became more prevalent among developing-country markets as well. Chart 5 plots (a) the two-year rolling correlations between four emerging markets'

[20]See Bruno Solnik, *International Investments* (Addison-Wesley, 1988)

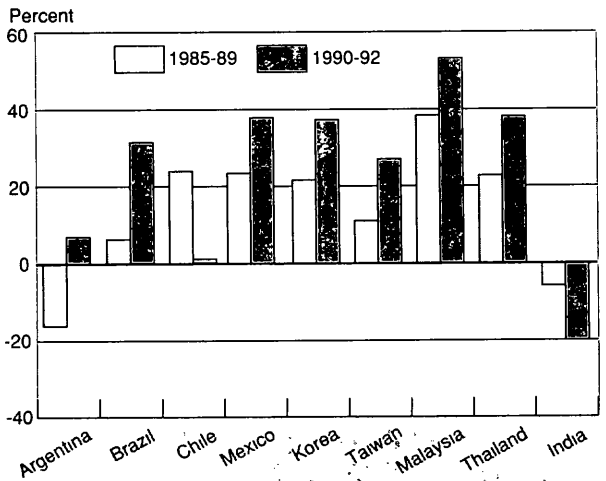
[21]See Paul Bennett and Jeanette Kelleher, "The International Transmission of Stock Price Disruption in October 1987," Federal Reserve Bank of New York *Quarterly Review*, Summer 1988, pp 17-33

monthly excess returns and the world monthly excess return and (b) the two-year rolling standard deviation of the world excess return.[22] The plots indicate that since 1986, world return volatility peaked twice. These two peaks are associated with the two largest post-1986 world stock market declines, the crash of October 1987 and the large decline of August 1990, the latter precipitated by large increases in international petroleum prices following Iraq's invasion of Kuwait. Similar declines hit seven of the nine emerging markets under consideration—Argentina, Brazil, Chile, Mexico, Thailand, Malaysia, and Taiwan—in October 1987 and August 1990. Consequently, the relationship between (a) correlation with world equity returns and (b) world return volatility was positive and statistically significant in each of these seven countries during the post-1986 period. The two countries in which the relationship was not statistically significant during the post-1986 period were Korea—whose equity market was not opened to direct foreign purchases until January 1992—and India—whose equity market remains closed to direct foreign purchases. In contrast, during the pre-1986

[22] An asset's excess return equals its return minus the return on a risk-free asset. As a practical matter, excess return correlations differ very little from return correlations during the period of analysis for the countries under examination. At each point in time, the twelve-month rolling correlation (standard deviation) equals the correlation (standard deviation) over the twelve-month period prior to and including the current month.

Chart 4

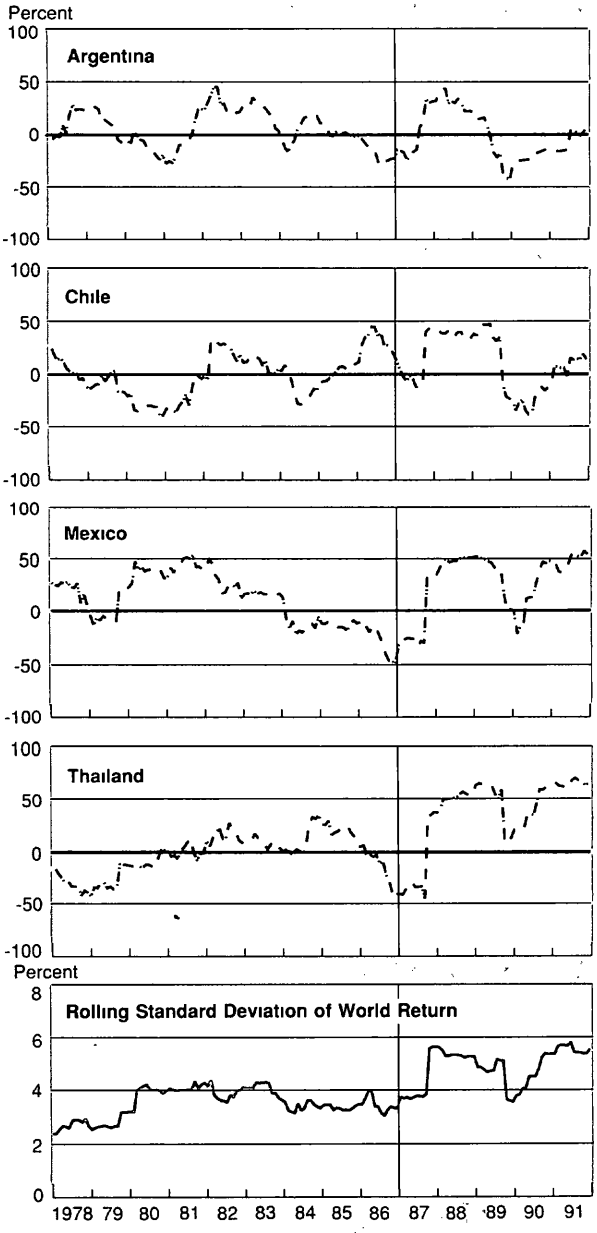
Changing Correlations between Developing-Country and World Monthly Returns



Source: International Finance Corporation, Emerging Markets Data Base.

Chart 5

Emerging-Market Return Correlations and World Return Volatility



Sources: International Finance Corporation, Emerging Markets Data Base; Morgan Stanley Capital International.

Notes: Dashed lines represent rolling correlation between country returns and world returns. Line separating 1986 and 1987 represents a structual break.

period, the relationship was statistically significant in only two countries out of the group of nine. Mexico and Thailand.

Structural changes in developing countries have promoted recent changes in the behavior of monthly return correlations between developed and emerging markets. During the latter 1980s, when many impediments to foreign equity portfolio inflows were eliminated by developing-country governments, international investors were increasingly able to shift between developed- and developing-country equity shares Emerging market equity returns consequently became more sensitive to the shifts in international investor sentiment that affected developed-country equity returns. Correlations between developing-country and developed-country monthly returns therefore increased, and events that sharply affected developed-country returns began to affect developing-country returns in a similar way[23]

A comparison of monthly and yearly correlations and covariances

An examination of return correlations based on annual data reveals that the emerging markets under consideration may be more integrated with the global financial system than is indicated by return correlations based on monthly data A comparison of the top panel with the bottom panel of Table 6 reveals that the (six) coefficients of excess-return correlation between the MSCI world index, Japan, the United States, and Europe do not vary significantly when the statistics are computed using monthly instead of yearly excess-return data. In contrast, among the emerging markets, yearly and monthly excess-return correlations can differ significantly. For instance, the yearly coefficient of excess-return correlation between Argentina and the NYSE is 62 percent, whereas the monthly coefficient of excess-return correlation is only 4 percent For the seven

[23]Of course, it can be argued that capital market integration need not imply high correlations (see Vihang R Errunza, "Emerging Markets Some New Issues," *Journal of Portfolio Management*, forthcomming) On the NYSE, for example, a wide range of correlations are observed between pairs of stocks Nevertheless,

Footnote 23 continued
the average correlation between pairs of common stocks on the integrated U S exchange is about 40 percent, which is much higher than most estimates of the average correlation between emerging market indexes and, say, the MSCI world index

Table 6

Correlation Matrix of Yearly Excess Returns: 1976-91

	Argentina	Brazil	Chile	Mexico	India	Korea	Thailand	World	Japan	NYSE	Europe
Argentina	1 00										
Brazil	**0.33**	1 00									
Chile	**0.43**	−0 09	1 00								
Mexico	0 31	**0.38**	**0.44**	1 00							
India	0 20	**0.37**	0 17	0.07	1 00						
Korea	−0 01	0 09	0 27	0 18	0 17	1 00					
Thailand	−0 01	0 08	0 35	0 31	−0 23	**0.46**	1 00				
World	**0.22**	0 34	**0.41**	0 44	**0 35**	0 32	0 27	1 00			
Japan	−0 06	0 07	**0.33**	0 31	0 14	**0.64**	0 33	*0 78*	1 00		
NYSE	**0.62**	**0.46**	**0.34**	0 33	**0.33**	−0 14	0 08	*0 73*	*0 21*	1 00	
Europe	0 02	0 28	**0.38**	0 44	**0.56**	0 24	0 37	*0 78*	*0 52*	*0 49*	1 00

Correlation Matrix of Monthly Excess Returns: 1976-91

	Argentina	Brazil	Chile	Mexico	India	Korea	Thailand	World	Japan	NYSE	Europe
Argentina	1 00										
Brazil	**−0.04**	1 00									
Chile	**0.10**	0 00	1 00								
Mexico	0 13	**−0.03**	**0.13**	1 00							
India	0 14	**−0.05**	0 04	0 01	1 00						
Korea	−0 10	−0 00	0 05	0 11	0 02	1 00					
Thailand	−0 01	−0 01	0 11	0 26	0 05	**0.02**	1 00				
World	**−0.03**	0 10	**0.06**	0 25	**0.05**	0 26	0 23	1 00			
Japan	−0 04	0 06	**0.08**	0 11	0 02	**0.26**	0 17	*0 72*	1 00		
NYSE	**0.04**	**0.06**	**0.04**	0 29	**0 02**	0 20	0 14	*0 80*	*0 25*	1 00	
Europe	−0 03	0 11	**0.08**	0 21	**0.16**	0 19	0 28	*0 81*	*0 53*	*0 55*	1 00

Notes Boldface type highlights those two-country couplets whose yearly return correlations exceed their monthly return correlations by at least 25 percentage points Italicized type highlights those couplets composed exclusively of developed countries

emerging markets included in the matrix, yearly excess-return correlations with the MSCI world index range between 22 percent and 44 percent. In contrast, the corresponding monthly excess-return correlations range between −3 percent and 26 percent.

The differences between these estimates of monthly correlations and yearly correlations point to the association of current returns in one market with past or future returns in another market. Significant impediments to capital mobility existed in most of the developing countries under consideration during the 1976-91 period. Restrictions on equity portfolio flows, including repatriation restrictions, undoubtedly dampened the monthly return correlations between these markets and the NYSE. In addition, poor liquidity in some of these markets made it difficult for investors to buy or sell stock quickly in response to changes in the economic environment. Many of these impediments to capital mobility were permeable over time, however, and investors were ultimately able to shift between foreign and domestic equity shares. Consequently, events that affected NYSE returns immediately tended to affect developing-country returns with a lag. This sort of lag structure tended to increase correlations between developing-country and developed-country returns at frequencies lower than one month.[24]

A statistical analysis of the difference between monthly and yearly return covariances provides additional evidence of the association between emerging markets' current returns and other countries' past or future returns (Box 2). This evidence implies that monthly return correlations have tended to understate the long-run interrelatedness of emerging markets and their more developed counterparts.

As impediments to capital mobility are increasingly reduced and emerging markets become more liquid, events that previously affected developing-country returns either before or after affecting developed-country returns will increasingly affect developing- and developed-country returns contemporaneously. This observation suggests that monthly return correlations between developed and developing countries may continue to rise in the future.

Convergence of stock market capitalization values

The same innovations that have promoted the integration of developing-country stock markets with the global financial system have encouraged a convergence of developing-country and developed-country ratios of stock market wealth to GDP. Market openings have tended to increase market capitalization, defined as the market value of outstanding equity shares listed on a country's stock exchanges, by increasing the demand for developing-country equity shares and thereby encouraging share price increases. Privatization programs and international equity placements have also contributed to the trend by increasing the supply of developing-country equity shares.

Emerging-market capitalization growth over the past decade has been striking. The combined capitalization of the largest nine emerging stock markets tracked by the IFC increased 761 percent between 1981 and 1991, from $64 billion to $551 billion (Table 7). Equity market capitalization in these nine markets grew twice as quickly during the period as equity market capitalization among the Group of Seven (G-7) countries, which increased 336 percent.

Market capitalization has also grown rapidly in relation to GDP in the emerging markets under examination. Between 1981 and 1991, the ratio of market capitalization to GDP more than doubled in all of the nine emerging markets except Brazil. Emerging equity markets were not unique in this respect, however; capitalization ratios also increased markedly in many of the G-7 economies, especially in the United Kingdom and Japan. Nevertheless, by 1991 capitalization ratios among the nine emerging markets had substantially converged towards those of their more developed counterparts. Malaysia's ratio (127 percent) exceeded those of all G-7 countries, while Chile's ratio (93 percent) was similar to the ratios of the United Kingdom (99 percent) and Japan (93 percent), and Taiwan's ratio equaled that of the United States (74 percent). By the end of 1991 within the group of developing and developed countries under examination, there appeared to be little correlation between market capitalization ratios and measures of economic development such as per capita income levels.

The historical rarity of such high capitalization ratios among developing countries is underlined by Goldsmith's 1985 data on two centuries of market capitalization ratios for the G-7 countries and for India and Mexico.[25] These data (Table 8) reveal that it is fairly unusual for countries' capitalization ratios to exceed 50 percent. The United States and the United Kingdom are notable exceptions because of the long-standing "thickness" of their securities markets in general and their equity markets in particular. In the bank-based economies of Germany, Italy, and Japan, however, capitalization ratios have historically hovered at levels below 50

[24]The existence of nonsynchronous trading is another potential explanation for the disparity between monthly and yearly correlations. Since developing-country stocks do not necessarily trade every day, monthly price data are not always based on end-of-month observations. This problem, which leads to underestimation of return correlations, becomes more modest as the frequency of observations becomes smaller.

[25]Raymond Goldsmith, *Comparative National Balance Sheets* (University of Chicago Press, 1985).

Box 2: Monthly and Yearly Correlations and Covariances

The linkages between one market's current returns and other markets' past and future returns are known as lead and lag effects This box examines whether these lead and lag effects are more important among emerging markets than among three of the world's most highly developed and integrated markets: the NYSE, Japan, and the United Kingdom Statistical theory holds that a comparison of monthly and yearly *covariances* provides more information relevant to this question than a comparison of monthly and yearly *correlations* Yearly return covariances can be decomposed as follows

$$cov(X_t, Y_t) = 12 \cdot cov(x_t, y_t) + \sum_{k=1}^{11} (12-k) \cdot cov(x_t, y_{t+k}) + \sum_{k=1}^{11} (12 - k) \cdot cov(y_t, x_{t+k}),$$

where X_t and Y_t denote year-t returns in the respective markets and x_t and y_t denote month-t returns in the same markets † This equation indicates that the covariance of yearly returns equals twelve times the covariance of monthly returns (the first term on the right-hand side) plus the sum of lead and lag effects (the second and third terms on the right hand side) Consequently, the yearly covariance exceeds twelve times the monthly covariance if and only if the sum of lead and lag effects is positive.

The following statistic, therefore, is a reasonable point estimate of the relative size of the sum of lead and lag effects between countries x and y.

$$\frac{\frac{1}{15}\sum_{t=1}^{16}(X_t - \bar{X})\cdot(Y_t - \bar{Y}) - \frac{12}{191}\sum_{t=1}^{192}(x_t - \bar{x})\cdot(y_t - \bar{y})}{\left|\frac{1}{15}\sum_{t=1}^{16}(X_t - \bar{X})\cdot(Y_t - \bar{Y})\right|}$$

The first term of the numerator is an estimate of the annual covariance (based on 16 annual observations spanning 1976-91), while the second term is twelve times an estimate of the monthly covariance (based on 192 monthly observations over the same period) The expected value of the statistic is zero under the null hypothesis that lead and lag effects sum to zero. Alternatively, the expected value of the statistic is positive under the hypothesis that the sum of lead and lag effects is positive

On average, this statistic is much higher for two-country couplets involving emerging markets than for couplets composed exclusively of the world's most developed equity markets The mean of the statistic over forty-nine couplets that include emerging markets is 66 3 percent, with a standard error of 10 1 percent ‡ The implied t-statistic of greater than 6 means that, for the group of emerging markets under consideration, the sum of lead and lag effects is significantly greater than zero for the 1976-91 period In contrast, the mean of the statistic over the three couplets exclusively involving the NYSE, Japan, and the United Kingdom is 1 5 percent with a standard error of 8 5 percent, which implies that the mean for these three couplets is not significantly different from zero in a statistical sense The difference between the emerging-market mean and the three-couplet mean is 64 8 percent, or more than thirteen times the standard error of the difference between the means. This result indicates that lead and lag effects play a larger role in emerging markets than in the most highly integrated of world equity markets

These results also indicate that monthly return covariances tend to understate the substantial interrelatedness of developing-country and developed-country equity markets over the longer intervals that matter to many investors The question then arises, Which measure of developing-country covariance risk is reflected in expected equity returns· a measure based on monthly time intervals or one based on yearly intervals?

Monthly and yearly correlations and the CAPM

According to the Capital Asset Pricing Model (CAPM), the ratio of the expected excess return of asset i to the expected excess return of the world portfolio should equal stock i's riskiness as measured by its "beta" with respect to the market portfolio Stock i's beta is defined as.

$$\rho_{iw}\frac{\sigma_i}{\sigma_w},$$

where rho denotes the correlation between asset i's excess return and the world excess return and sigma denotes standard deviation The CAPM implies that asset i's expected excess return must reflect the risk associated with asset i's volatility or standard deviation In addition, the model implies that assets that are more highly correlated with the world portfolio must offer higher expected returns. The reason is that assets that are highly correlated with the world index do not provide

†This relationship is derived under the assumption that returns equal log differences of total return indexes

‡The 42 couplets include (7 x 6)/2 = 21 combinations involving emerging markets exclusively plus (7 x 4) couplets involving the emerging markets and Japan, Europe, the NYSE, and the MSCI world index The (approximate) standard error of the statistic is obtained by dividing the standard deviation of the point estimate over the couplets by the square root of the number of couplets

Box 2: Monthly and Yearly Correlations and Covariances *(Continued)*

the diversification benefits of assets that are relatively uncorrelated with the world index

Implicitly, all tests of the CAPM are joint tests of the CAPM and the model used to estimate ex ante returns and betas This section examines the simple case in which arithmetic-mean returns are used to proxy for expected returns while sample covariances and standard deviations are used to construct ex ante betas This exercise, while fraught with problems, still helps to reveal which measure of risk is better reflected in developing-country equity returns. the beta constructed using yearly data or the beta constructed using monthly data §

The data indicate that developing-country equity returns are more closely related to yearly measures of covariance risk than to monthly measures of risk The right-hand panel of the chart plots ratios of mean country excess returns to mean world excess returns against betas calculated with annual data from 1976-91 As predicted by the CAPM, the data indicate that country excess returns bear a positive and statistically significant relationship to country betas based on annual data (see table) Whereas the CAPM, however, predicts that the slope will equal one (meaning that there will be a one-to-one relationship between betas and excess return ratios), the regression analysis indicates that the estimated slope coefficient is almost three standard deviations greater than one

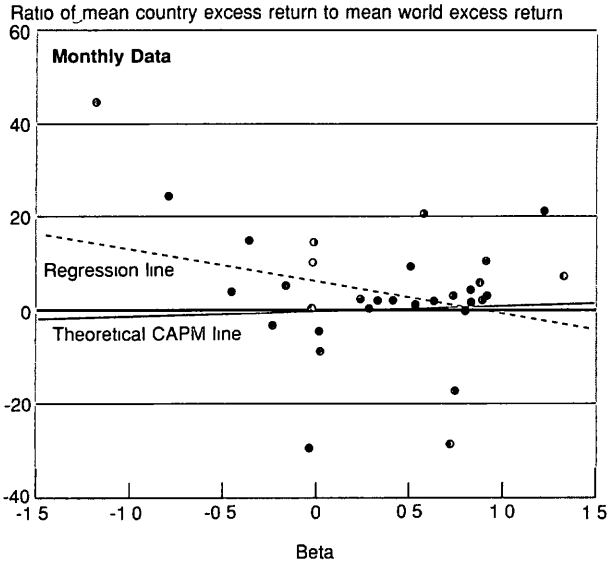
§A number of issues must be addressed when applying the CAPM to the international setting A sufficient assumption is perfect correlation between the world market portfolio and world consumption Alternatively, one can view the model as testing the mean-variance efficiency of the world market portfolio

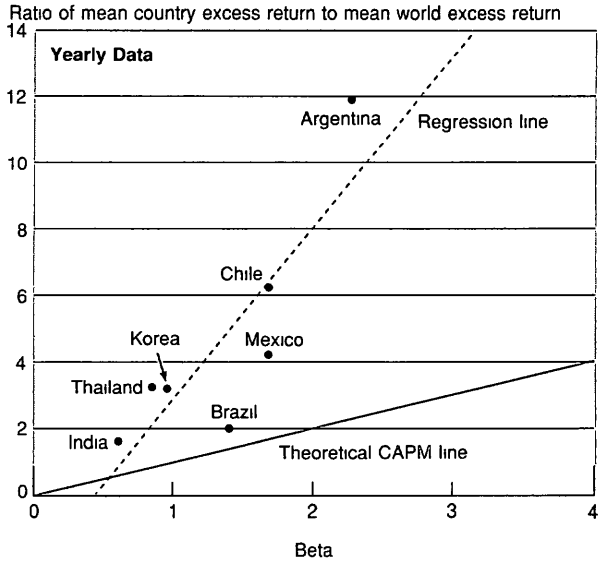
Equations for Capital Asset Pricing Model

	Coefficient			
	Monthly Equation		Yearly Equation	
Variable				
Constant term	6 3	(13 5)	−2 3	(2 1)
Beta	−7 0	(4 2)	5 2	(1 5)
Statistics				
n	32		7	
R^2	09		71	

Note Standard errors are given in parentheses

Capital Asset Pricing Model: Tests Using Monthly and Yearly Data





Sources International Finance Corporation, Morgan Stanley Capital International

Box 2: Monthly and Yearly Correlations and Covariances *(Continued)*

In contrast, betas calculated on a monthly basis are not positively correlated with relative equity returns. A test of the monthly CAPM was made using monthly excess-return data from a panel data set that was formed by breaking the experience of each country into four-year periods The left-hand panel of the chart plots ratios of mean country excess returns to mean world excess returns against betas calculated using monthly data from the various four-year periods during 1976-91. The scatter plot reveals that we can reject with certainty the joint hypothesis that the monthly CAPM holds and that population moments (mean returns, standard deviations, and correlations) are reasonable proxies for ex ante moments

Table 7

Total Market Capitalization: 1981-91

	1981		1986		1991	
	Billions of U S Dollars	Percent of GDP	Billions of U S Dollars	Percent of GDP	Billions of U S Dollars	Percent of GDP
Canada	106	36	166	46	267	45
France	38	7	150	20	374	31
Germany	63	9	258	29	394	25
Italy	24	6	140	23	154	13
Japan	431	37	1,842	93	3,131	93
United Kingdom	181	35	440	78	1,003	99
United States	1,333	44	2,637	62	4,180	74
Group of Seven markets	2,176	33	5,632	60	9,503	65
All developed markets	2,502	—	6,367	—	10,760	—
Argentina	2	2	2	2	19	17
Brazil†	13	5	42	16	43	9
Chile	7	22	4	24	28	93
Mexico	10	4	6	5	98	40
India	7	4	14	6	48	16
Korea	4	6	14	13	96	37
Thailand	1	3	3	7	36	41
Malaysia	15	61	15	54	59	127
Taiwan	5	11	15	19	125	74
Nine emerging markets	64	6	115	12	551	32
All emerging markets tracked by International Finance Corporation	83	—	145	—	643	—

Sources International Finance Corporation, *Emerging Stock Markets Factbook*, various issues, and International Monetary Fund, International Financial Statistics

Note Capitalization data refer to the market value of shares listed on domestic exchanges, including shares associated with international placements and those used to back American depository receipts

†Sao Paulo only

percent. This observation makes the 1991 capitalization ratios of Korea and Mexico appear all the more impressive. By 1991, capitalization ratios in these two bank-dominated economies had increased to levels surpassing the historical capitalization ratios of the more developed bank-dominated economy of Germany Of course, the 1991 capitalization ratios of Malaysia, Chile, and Taiwan appear even more impressive when compared with the historical capitalization ratios of Germany, Italy, France, and Japan

Another striking feature of Goldsmith's data—the large upward and downward swings of individual countries' capitalization ratios over time—suggests the possibility that some of these high capitalization ratios may be transitory The United States' capitalization ratio increased quickly from 95 percent in 1913 to 193 percent in 1929, declined dramatically to 58 percent in 1950, and increased again to 124 percent in 1965, only

to decline again to 57 percent in 1978 This sort of long-term volatility, which is common to almost all of the countries for which Goldsmith collected national balance-sheet data, implies that capitalization ratios do not tend to rise steadily or monotonically as economies develop over time Capitalization ratios increase as stock markets boom and decline as they bust Consequently, there does not appear to be a simple relationship between stages of economic development and capitalization ratios.

Even when viewed from a longer term perspective, however, the rapid growth of capitalization ratios among the emerging markets during the 1980s is quite impressive For example, it may have taken as many as eighty-five years (1810-95) for the United States' capitalization ratio to rise from 7 percent to 71 percent (we cannot be absolutely sure, however, given the instability of the series) In contrast, the Taiwanese capitalization ratio rose from 11 percent to 74 percent in the ten years between 1981 and 1991 The data, therefore, suggest that the emerging stock markets of the present era have probably grown more rapidly than the stock markets of the G-7 countries during the nineteenth century

Market capitalization remains highly concentrated

Market capitalization has been more highly concentrated in the emerging markets under study than in the highly developed markets of the United States and Japan In Mexico, for example, shares of Telemex alone accounted for 17 percent of domestic capitalization at the end of 1991 [26] In Argentina, Telefonica de Argentina accounted for a similarly high 18 5 percent of total market capitalization In contrast, Exxon—the most highly capitalized stock in the United States—accounted for only 2 6 percent of total market capitalization at the end of 1991

An alternative measure of concentration reinforces the impression that emerging equity markets are often dominated by a relatively small group of highly capitalized shares. In 1991, the ten most highly capitalized stocks in Argentina together accounted for 68 percent of market capitalization, while the ten most highly capitalized stocks in Chile accounted for 50 percent of market capitalization In contrast, the comparable figures for the United States and Japan were 15 7 percent and 16 7 percent, respectively

In many emerging markets, however, capitalization has been less concentrated than in Germany's equity market, which is not as developed as those in the United States and Japan The share of market capitalization attributable to the ten most highly capitalized German firms was 37 9 percent at the end of 1991, a figure that surpassed comparable concentration measures for India (23 4 percent), Brazil (27 0 percent), Korea (31 2 percent), Thailand (31 7 percent), Taiwan (35 9 percent), Malaysia (36 1 percent), and Mexico (36 5 percent)

According to one measure of equity market maturity—the ratio of capitalization to GDP—several developing-country markets appear to have converged with the world's mature markets. Nevertheless, an alternative measure, namely market concentration, indicates that these markets are less than fully developed

Equity issuance and investment finance

With the maturation of emerging equity markets has come a greater reliance on those markets as a source of funds Equity issuance has recently surged in the more mature developing countries, that is, those developing countries farthest along the path of industrializa-

[26] The data sources for this section are *Euromoney Guide to World Equity Markets* and International Finance Corporation, *Emerging Stock Markets Factbook*

Table 8

Ratio of Market Capitalization to GDP: 1810-1978

Percent

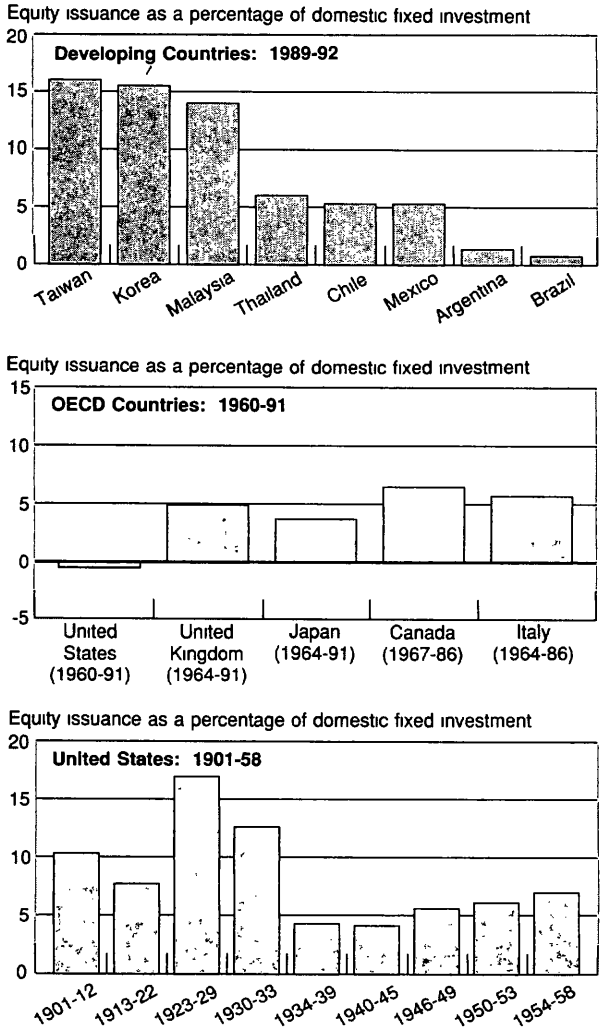
	1810	1850	1875	1895	1913	1929	1939	1950	1965	1973	1978
Canada	—	—	—	—	—	—	—	**59**	46	36	41
France	0	12	38	—	**65**	23	—	25	**111**	**63**	39
Germany	—	6	17	26	37	29	17	13	31	27	24
Italy	—	11	7	11	6	3	2	19	**57**	28	10
Japan	—	—	4	32	41	**75**	**118**	24	46	29	39
United Kingdom	13	**72**	**74**	**156**	**121**	**154**	**182**	**110**	**83**	**65**	**76**
United States	7	23	**54**	**71**	**95**	**193**	**105**	**58**	**124**	**83**	**57**
India	—	1	2	3	5	9	14	12	14	15	12
Mexico	—	—	—	—	—	25	47	44	30	25	**53**

Source Raymond Goldsmith, *Comparative National Balance Sheets* (University of Chicago Press, 1985)
Note Capitalization ratios exceeding 50 percent appear in boldface

tion. Equity issuance in several of the rapidly growing economies of East Asia has exceeded the post-World War II norm for G-7 economies and has been roughly in line with the high rates of equity issuance experienced by the United States during an earlier stage in its development process. These observations are consistent with the hypothesis that equity issuance as a source of finance tends to become increasingly important in the latter part of an economy's rapid-growth stage of economic development and subsequently becomes more modest.

Chart 6

Equity Issuance and Domestic Investment



Sources: International Finance Corporation, Organization for Economic Cooperation and Development, *Financial Statistics*, Board of Governors of the Federal Reserve System, Flow of Funds Accounts, Raymond Goldsmith and Robert Lipsey, *Studies in the National Balance Sheet of the United States*, vol 1 (Princeton University Press, 1963), U S Department of Commerce, *Historical Statistics of the U.S. Colonial Times to 1970* (1975)

Note: Grey-shaded bars represent developing countries

Equity issuance in the United States earlier in the century largely reflected the transition from closely held private ownership to ownership through publicly traded equity shares In recent years, this transition has found a developing-country parallel in a shift from government ownership of enterprises to private-sector ownership of joint-stock companies Privatization has accelerated equity issuance in several developing countries and thereby primed the pump for additional equity issuance by private corporations seeking nondebt sources of finance

Since 1989, ratios of equity issuance to gross domestic fixed investment have been highest among those developing countries farthest along the path of industrialization. Equity issuance has been a particularly important form of investment finance in Taiwan and South Korea, developing countries that have moved beyond the manufacture of purely labor-intensive products, such as textiles, to higher value-added production In these two countries, ratios of equity issuance to investment have recently exceeded 15 percent (Chart 6). In Malaysia and Thailand, countries that embarked on paths of rapid industrialization after Taiwan and Korea but have been growing rapidly for two decades now, issuance-to-investment ratios averaged 14 and 6 percent, respectively

The ratio of equity issuance to investment has been smaller in the Latin American countries under consideration than in the Asian countries Within Latin America, however, equity issuance has been highest in those countries where economic reform is most advanced Issuance has been a steady, if not predominant, source of investment finance in Chile Mexico's average issuance-investment ratio for the period masks the underlying fact that equity issuance in Mexico was very weak before 1990 but thereafter accelerated. Issuance of equity shares for cash, however, was relatively limited in Argentina and Brazil during 1989-1992

The G-7 record of equity issuance during the past three decades also supports the hypothesis that equity issuance becomes increasingly important during rapid industrialization but then tapers off somewhat In contrast to the recent experiences of the fast-growing economies of South Korea, Taiwan, and Malaysia, net equity issuance among the more mature G-7 economies has not been a quantitatively important source of investment finance. This conclusion is borne out by Chart 6, which presents ratios of net equity issuance to gross

domestic fixed investment for the United States, the United Kingdom, Japan, Canada, and Italy. Of these five developed economies, Canada has had the highest ratio of net equity issuance to gross domestic fixed investment over the past three decades. Aside from the United States, where net equity issuance has been very low relative to investment (and often negative), the ratio does not vary too widely over countries or across time: the ratio ranges from a United Kingdom low of 2.8 percent in the 1960s to a Canadian high of 7.2 percent in the 1980s.

The long-run U.S. record also fits well with the stage-of-development hypothesis. Although net equity issuance has been a relatively unimportant source of corporate finance in the United States during the past three decades, it played a much more important role in an earlier stage of the country's development, before World War II. Between 1901 and 1939, the proportion of gross domestic fixed investment financed by net equity issuance varied from 7 to 17 percent.

The stage-of-development hypothesis is also supported by a more detailed accounting of the recent experiences of several developing economies (Table 9). Although the four Asian economies under examination have grown rapidly over at least the past two decades, equity issuance has only recently begun to accelerate. During 1981-86, Malaysia had the highest issuance-investment ratio of the group at 3.9, a figure that is not unlike the G-7 norm of the past three decades. Equity issuance in these economies did not take off until the latter 1980s, at least two decades after these four economies had embarked on their rapid growth paths.

Stock market booms have frequently been the proximate cause of surges in equity issuance in both developed and developing countries. Increases in share prices lower the cost of equity financing for corporations and thereby provide strong incentives for firms to issue shares. In the United States, for example, equity issuance peaked at 17 percent of gross domestic fixed investment during 1923-29 as the NYSE rallied. In Korea and Taiwan, equity issuance peaked during 1989-90 as equity markets boomed and price-to-earnings multiples rose as high as 40 in Korea and 50 in Taiwan. Stock price movements have also played a role in Mexico's recent surge in equity issuance. Mexico's stock market opening in 1989, combined with policies to promote sustainable private sector growth, stimulated the demand for Mexican equity shares and thereby encouraged an increase in price-to-earnings multiples from 5 to 15 between 1988 and 1991.

Privatization has been a key factor underlying the recent surge in developing-country equity issuance. Malaysia's equity issuance peak of 1990, for example, coincided with the privatization of Syarikat Telekom Malaysia. In what constituted the largest flotation ever on the Kuala Lumpur Stock Exchange, more than $850 million in equity shares of Telekom were sold publicly in 1990. In Mexico also, the recent acceleration in equity issuance has been fed by privatization. Sales of Telemex shares by the Mexican government amounted to more than $3 billion between 1990 and 1992. More than two-thirds of these issues were made through international ADR sales.

Once initiated by surges in equity issuance, the process of capitalization growth in developing-country equity markets has the potential to become self-sustaining. Initial surges in equity issuance may well prime the pump for subsequent increases in equity issuance by increasing the potential investor base for domestic equity shares and thereby increasing market depth beyond a critical level. In the past, developing-country equity markets have tended to be thin markets, characterized by small numbers of traders, consequently, prices have been generally very sensitive to the impact

Table 9

Ratio of Equity Issuance to Gross Domestic Investment

	Taiwan	Korea	Malaysia	Thailand	Chile	Mexico	Argentina	Brazil
1966-75	—	—	2.5	—	—	—	—	—
1976-80	—	—	1.2	1.4	—	—	—	—
1981-86	1.9	2.0	3.9	1.3	—	—	—	—
1987	—	5.8	7.6	4.9	—	—	—	—
1988	—	20.9	4.2	2.7	—	—	—	—
1989	5.8	32.0	8.3	4.5	5.7	1.4	0.4	0.6
1990	51.7	4.8	23.1	6.1	4.6	0.6	1.9	0.6
1991	4.3	3.4	10.8	8.4	3.3	10.8	2.0	0.7
1992	2.4	1.9	13.9	4.9	7.6	8.6	—	1.0

Sources: International Finance Corporation staff estimates; International Monetary Fund, International Financial Statistics; country sources.

of individual traders' demand shifts. In deep markets, in contrast, transactors are so numerous that the uncorrelated demand shifts experienced by individual traders tend to offset each other and leave market prices unaffected. To the extent that shareholders are reluctant to participate in thin markets, thinness can lower the demand for shares and thereby inhibit equity issuance. In this way, thin equity markets can get caught in a cycle of low demand, low issuance, and lackluster capitalization growth.[27]

Government liberalization measures can potentially stimulate share demand and move an equity market from an equilibrium of thin trading and low issuance into an equilibrium of substantially higher trading and issuance. The recent experiences of several of the emerging equity markets under examination have conformed to this pattern. In particular, market openings and international equity offerings have increased the depth of trading in the shares of developing-country companies such as Telemex and appear to have thereby stimulated additional investor demand. But the international offering of Telemex ADRs had other important spillover effects. As international investors purchased Telemex ADRs, they accumulated information about the workings of the Mexican economy. Once these investors had made substantial investments in acquiring knowledge about the Mexican economy, they became more likely to invest in the equity shares of other Mexican firms. The dismantling of barriers to foreign investment and international offerings of blue-chip companies can thus pave the way for substantial increases in a market's investor base.

Turnover values and market breadth

Trading activity has increased substantially in developing-country equity markets over the past decade. The most prominent developing-country equity issues are now quite liquid and change hands as frequently as many developed-country issues listed on the NYSE or the London Stock Exchange. In an important sense, however, developing-country equity markets still lack the breadth of their more developed counterparts. High aggregate turnover values often reflect the high turnover values of a relatively small handful of issues. Outside this set of highly active issues, trading values decline greatly.

The value of turnover increased substantially in each of the nine emerging equity markets between 1981 and 1991 (Table 10). Trading exploded on Taiwan's exchange, increasing from $5.6 billion in 1981 to $365.2 billion in 1991. Trading values also increased by over 500 percent in Thailand, Korea, Mexico, and Argentina.

By 1991, the most active stocks in several of these markets appeared to be as liquid as the issues of a typical firm listed on the NYSE. The value of trading in Telebras, the Brazilian telephone company, was $3.4 billion during 1991 (Table 11). During the same year, on the Bombay Stock Exchange, turnover of the Associated Cement Company amounted to more than $3.2 billion. As a standard of comparison, the trading value of the average stock on the NYSE during the period was $334 million, or roughly 10 percent of the trading values of each of these two developing-country companies.

Listings on the NYSE have imparted increased liquidity to several developing-country stocks. Trading in Telemex shares, for example, amounted to $4.3 billion on the Mexican Bolsa in 1991. Meanwhile, the estimated value of trading in Telemex ADRs on the NYSE, where Telemex was the fourteenth most active issue during 1991, amounted to $8.4 billion. The ability of arbitragers to create and/or redeem Telemex ADRs in order to enforce price parity between Telemex ADRs on the NYSE and Telemex shares on the Bolsa implies that liquidity in one market translates into liquidity in the other. Consequently, a reasonable measure of Telemex's liquidity is the combined trading value in Telemex shares on the NYSE and the Bolsa. The combined trading value of $12.7 billion means that Telemex was one of the most liquid stocks in the world during 1991.

In an important respect, however, many of the devel-

Table 10
Value of Shares Traded
Millions of U.S. Dollars

	1981	1991	Percent Change
Argentina	454	4,824	963
Brazil	6,185	13,373	116
Chile	375	1,883	402
Mexico	4,181	31,723	659
India	6,693	24,295	263
Korea	3,721	85,464	2,197
Taiwan	5,677	365,232	6,334
Malaysia	3,498	10,657	205
Thailand	108	30,089	27,760
United States	415,760	2,254,983	442
Japan	223,835	995,939	345
Germany	13,670	818,603	5,888
Italy	10,850	43,307	299
United Kingdom	32,542	317,866	877
France	8,403	118,218	1,307

Notes: Value traded data refer to share turnover on domestic exchanges. Exchanges of American depository receipts on foreign markets are not included in the totals.
Sources: International Finance Corporation, *Emerging Stock Markets Factbook*, various issues; *Euromoney Guide to World Equity Markets*, 1992.

[27]For an in-depth analysis of this argument, see Marco Pagano, "Endogenous Market Thinness and Stock Price Volatility," *Review of Economic Studies*, vol. 56 (1989), pp. 269-88.

oping-economy stock markets lack breadth In most emerging markets, trading values decrease substantially outside the small set of stocks with high trading values A good measure of the breadth of a market's liquidity is obtained by taking the average trading value of stocks outside the ten most active. In Brazil, for example, the average value traded of stocks outside the top ten was $4 million, a very small fraction of the $3 4 billion figure for Telebras India's markets also appear to have very little breadth by this measure the average trading value of stocks less active than the top ten was only $2 million

Of the Latin American markets under consideration, the Mexican Bolsa appears to have the greatest breadth In Mexico, average turnover in 1991 for stocks outside the ten most active was $86 million, a figure that amounts to roughly 15 to 20 percent of the corresponding numbers for Japan ($427 million) and Germany ($593 million) By this measure, the Mexican stock market has much more breadth than the markets of Argentina, Brazil, and Chile, where average turnover values for stocks outside the ten most active did not exceed $7 million in 1991

According to an alternative measure, however, the Mexican market has also lacked substantial breadth Following the world stock market crash of October 1987, trading appears to have broken down for several of the market's most highly capitalized issues Seven of the twenty-six stocks tracked by the IFC at the time did not trade at all on five or more trading days in November 1987, the month after the crash In the months before the crash, most of these stocks had traded virtually every day. Apparently, the markets for these stocks were not deep enough to withstand the October 1987 shock, and liquidity consequently deteriorated

But even during more placid times, many Mexican stocks do not trade for several days a month. During February-May 1992, for example, more than two hundred issues were listed on the Mexican Bolsa Sixty-six of these issues were included in the IFC index for Mexico, largely on the basis of their liquidity and market capitalization Of the sixty-six issues, thirty-three traded on fewer than 75 percent of the trading days during the period, while twenty-two traded on fewer than 50 percent of the trading days. That such a large proportion of issues trade infrequently on the Mexican Bolsa implies

Table 11

Average Value Traded: 1991

Millions of U S Dollars per Issue

	Among All Issues	Most Active Issue	Among Ten Most Active Issues	Among Other Issues
Argentina	28	729	373	7
Brazil	11	3,419	825	4
Chile	9	323	115	3
Mexico	152	4,309	1,462	86
India	4	3,210	1,160	2
Korea	125	—	—	—
Taiwan	1,653	—	—	—
Malaysia	33	—	—	—
Thailand	109	1,775	929	78
United States	334	38,790	16,925	310
Japan	473	20,655	10,058	427
Germany	1,227	92,449	42,922	593
Italy	124	—	—	—
United Kingdom	166	—	—	—
France	141	—	—	—

Average Share Turnover: 1991

Millions of Shares per Issue

Korea	6	144	99	5
Taiwan	801	8,454	3,614	668
Malaysia	38	505	293	30
United States	15	553	429	14

Sources International Finance Corporation, *Emerging Stock Markets Factbook*, 1992, *Euromoney Guide to World Equity Markets*, 1992, New York Stock Exchange, and Federal Reserve Bank of New York staff estimates

that the market lacks breadth [28]

In theory, market thinness is associated with increased volatility.[29] Return volatility, however, also depends importantly on the nature of information flows into a market. The historically volatile economic environments of many of the world's developing countries tend to produce the type of information flows that generate volatile asset returns.

The economics of return volatility

An important difference that remains between emerging markets and their more developed counterparts is that, in general, return volatility remains much higher among emerging markets. This section documents cross-country differences in return standard deviations and identifies factors that explain these cross-country differences. These factors include the volatility of macroeconomic fundamentals, the currency denomination of returns, and the degree to which trading within a market is concentrated among a small handful of issues.

Volatility: the stylized facts

Some, but not all, of the developing-country indexes under consideration have exhibited high levels of excess-return variance relative to the NYSE index and the MSCI world, Europe, and Japan indexes (Chart 7).[30] During 1976-91, the four Latin American countries and Taiwan registered the highest standard deviations among the markets examined, with Argentina heading the list as the most volatile market in the sample Malaysia, India, and Thailand, in contrast, have exhibited low excess-return volatility relative to the other developing countries in the sample. Return standard deviations in these equity markets, in fact, were not much higher than the standard deviation of Japanese returns during the sixteen-year period

Even in its earlier stages of development, the NYSE did not exhibit the degree of volatility that has been seen in the four Latin American markets and Taiwan over the past sixteen years. Chart 7 shows that the standard deviation of monthly returns on the NYSE has been remarkably steady over the past two hundred years Between 1802 and 1831, the standard deviation

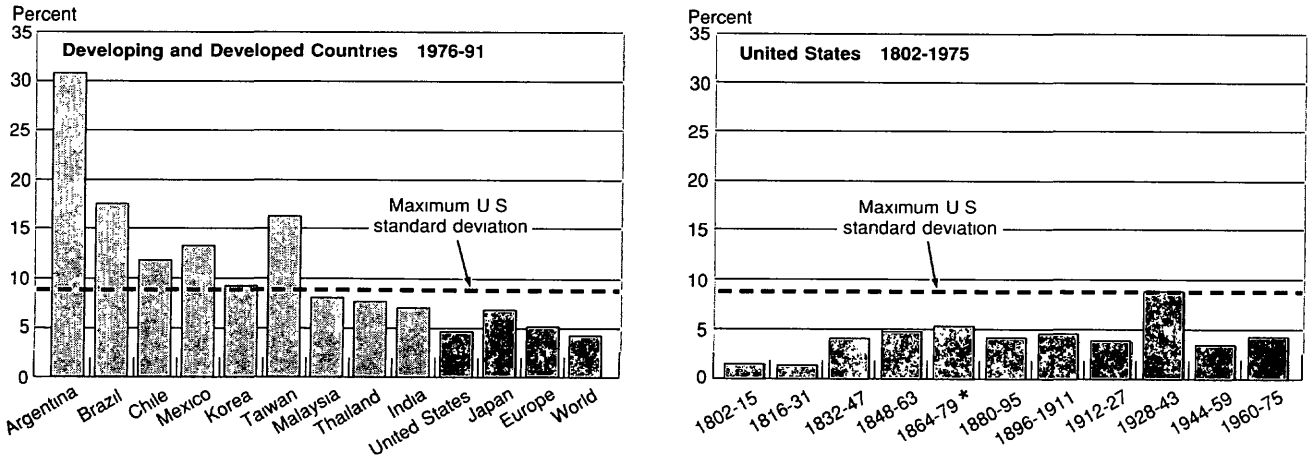
[28]The IFC has three main criteria for including stocks in its indexes market capitalization, liquidity, and industry classification In the case of Mexico, however, the IFC includes more than one class of stock for several companies The fact that these classes are not chosen for inclusion on the basis of liquidity does not significantly modify the interpretation that only a relatively small group of shares trade continuously on the Mexican Bolsa

[29]George Tauchen and Mark Pitts, "The Price Variability-Volume Relationship on Speculative Markets," *Econometrica*, vol 51, no 2 (March 1983), pp 485-505

[30]Unless otherwise noted, return standard deviations are dollar-denominated return standard deviations

Chart 7

Standard Deviations of Monthly Returns



Sources International Finance Corporation, Emerging Markets Data Base, Center for Research in Securities Prices, Morgan Stanley Capital International, William Schwert, "Indexes of United States Stock Prices, 1802-1987," *Journal of Business*, July 1990

Note Grey-shaded bars represent developing countries

* During this period, standard deviation refers to rate of return calculated in British pounds

was relatively low, hovering at roughly 1.5 percent. Volatility peaked during the 1928-43 period when the standard deviation of returns rose to 8.8 percent. Apart from these periods, however, standard deviations for the various periods under consideration remained within the narrow range of 3.5 percent to 5.3 percent.

Return volatility and macroeconomic fundamentals

That NYSE volatility exhibited no significant trend over the past two hundred years indicates that the high volatility exhibited between 1976 and 1991 by many of the emerging markets under examination cannot simply be attributed to their "stage of development." Consequently, the question arises, What causes some markets to display greater return volatility than others? Are returns more variable in countries in which economic fundamentals are more variable?

It appears that returns are more likely to be volatile in countries that pursue unstable monetary and exchange rate policies. The cross-country data, covering the period 1976-91, indicate that a statistically significant relationship exists between return volatility and the volatilities of inflation rates and real exchange rate changes (Chart 8). Equity returns were particularly volatile in the four Latin American countries under study: Argentina, Brazil, Chile, and Mexico. Rapid monetary expansion in these economies led to high and volatile rates of inflation. Furthermore, the region's governments—particularly those in Argentina and Mexico—often attempted to restore real exchange rate competitiveness by implementing large nominal exchange rate devaluations. This policy pattern, of course, bred substantial real exchange rate volatility. Frequent policy shifts generated considerable uncertainty regarding the future paths of domestic firms' input prices, output prices, sales, and therefore profitability. Since equity shares are claims on future corporate cash flows, volatile stock returns went hand-in-hand with volatile profit streams.

Additional evidence supports the notion that volatile stock returns are associated with volatile corporate profit streams. First, return volatility is closely tied to a direct measure of the volatility of corporate cash flows. Chart 8 plots the tight relationship between the standard deviation of equity returns and the standard deviation of dividend-per-share growth in U.S. dollars. Second, return volatility is correlated with the volatility of export growth, which in turn is linked to the volatility of corporate sales and therefore profits.

Return volatility: currency considerations

Another question is whether the high standard deviations of dollar-denominated returns among developing countries simply reflect the effects of converting local-currency returns into dollar returns through volatile nominal exchange rates. The answer appears to be negative. Of the seven developing economies listed in Table 12, only Mexico shows a standard deviation of dollar-denominated returns exceeding the standard deviation of local-currency returns by more than 3 percent. In Argentina and Brazil, in fact, dollar-denominated returns have had lower standard deviations than returns denominated in local currencies. In contrast, among countries belonging to the Organization for Economic Cooperation and Development, standard deviations of dollar-denominated returns have ranged between zero and 30 percent higher than standard deviations of local-currency denominated returns.

The difference between the variance of dollar-denominated and local-currency returns can be expressed as the difference between two covariances:

VAR (dollar rate of return) −

VAR (local-currency rate of return) =

COV (rate of exchange rate appreciation, dollar rate of return) −

COV (rate of exchange rate depreciation, local-currency rate of return).

The first covariance term on the right-hand side tends to exceed the second term when real shocks, as opposed to monetary shocks, are the predominant form of disturbance to an economy. Unanticipated government expenditure increases, tax cuts, and private investment booms typically cause the exchange rate to appreciate and increase dollar-denominated returns. In theory, these types of aggregate demand shock put upward pressure on interest rates, thereby inducing exchange rate appreciations. Simultaneously, these stimuli tend to increase corporate earnings, thereby increasing stock prices in both local-currency and dollar terms.[31]

By contrast, unanticipated monetary shocks tend to increase the covariance between the rate of exchange rate depreciation and local-currency returns. In theory, unanticipated monetary shocks would decrease interest rates and increase the local-currency prices of all assets, including equity shares and foreign exchange.

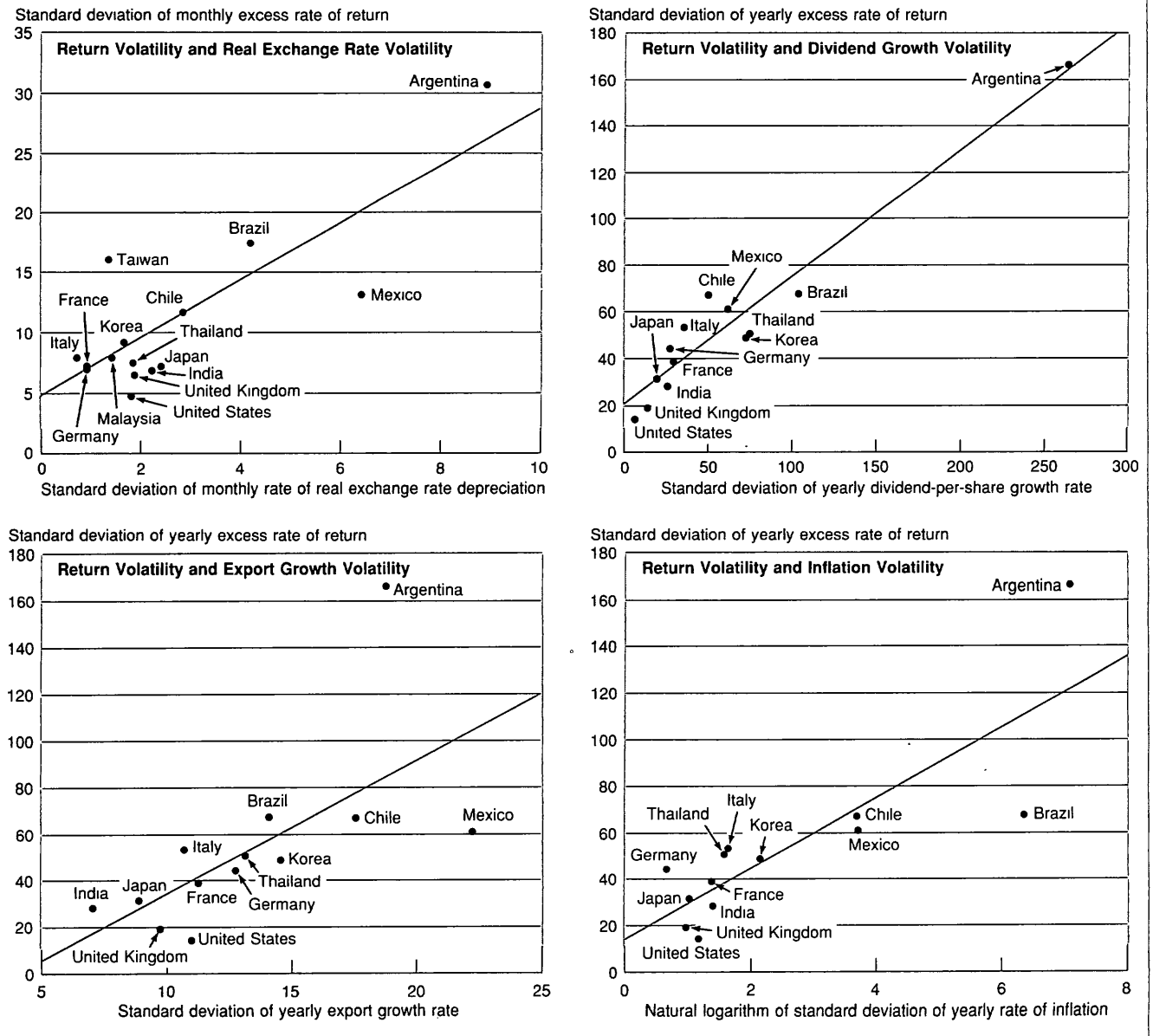
An implication of this analysis is that the variance of dollar returns will tend to exceed the variance of local-currency returns when real shocks predominate. Conversely, local-currency returns will be more volatile than dollar returns when monetary shocks predominate. The cross-country evidence given in the table accords well

[31]Local-currency returns will increase provided that the positive effect of the increase in local-currency earnings is not totally offset by the negative effect of the unanticipated increase in interest rates. Of course, dollar returns may still rise even if this condition is not met

with this interpretation. In the cases of Argentina and Brazil, high-inflation countries where monetary shocks have presumably predominated, the second covariance term has exceeded the first, and the variance of dollar-denominated returns has been lower than the variance of returns denominated in local currency. In Italy—a high-inflation country by European standards—the two variances have been roughly equal, whereas in Ger-

Chart 8

Macroeconomic Determinants of Return Volatility



Sources: International Finance Corporation, Emerging Markets Data Base; Morgan Stanley Capital International; International Monetary Fund, International Financial Statistics; Morgan Guaranty; Bank for International Settlements.

Note: Solid line represents ordinary least squares equation.

many and Japan—two low-inflation countries—the variance of dollar-denominated returns has exceeded the variance of local-currency returns

Additional evidence in favor of this interpretation is found in the U.S. record under the greenback standard during 1862-78 The British pound of this period should be regarded as a "hard" currency, somewhat like the modern-day dollar, and the greenback should be considered a "soft" currency, akin to many developing countries' local currencies The Civil War period between 1862 and 1865 is of particular interest. During this period, the standard deviation of U.S equity returns in terms of the British pound was 8 4 percent, much higher than the 5.5 percent standard deviation of returns in local currency terms.[32] Thus, during this period, the first of the two covariance terms (the term associated with real shocks) was greater than the second (the term associated with monetary shocks) [33] This finding makes sense when one considers that real shocks must have been predominant during the period. News of Union successes (failures) during the Civil War would have increased confidence (pessimism) in both business prospects and prospects of a return to the gold standard at the pre–Civil War parity Consequently, war news would have strengthened the correlation between equity returns in British pounds and the rate of appreciation of the greenback

This section's interpretation of the relationship between return volatility and macroeconomic volatility does not turn on the choice of unit of account or numeraire. Observe that the ordering of equity markets in terms of return volatility does not appear to depend greatly on the currency denomination of returns One lesson to be drawn from this finding is that the positive relationship between real exchange rate volatility and dollar-denominated return volatility does not simply reflect the pass-through of nominal exchange rate movements Instead, real exchange rate volatility implies risk for firms whose relative input and product prices, and thus rates of profit, ride the roller coaster of the real exchange rate.

Return volatility and concentration

In seeking an explanation for differences in emerging markets' return volatility, one should also consider the relationship between market concentration and volatility It seems logical that returns would be more volatile in markets in which market capitalization and turnover are concentrated among a small subset of stocks In a highly concentrated market, the market index is not very well diversified because it largely represents only a small handful of firms. Because less diversified portfolios tend to be more volatile, one would expect more concentrated markets to be more volatile. Evidence in favor of this hypothesis is presented in a scatter-diagram of return volatility and trading concentration, where trading concentration is defined as the share of turnover attributable to the ten most active stocks in a given market (Chart 9). The relationship is positive and statistically significant To be sure, returns in Argentina and Brazil are more volatile than the estimated relationship between return volatility and trading concentration would predict. These discrepancies make sense, however, because Argentina and Brazil have experienced such great macroeconomic volatility Return standard deviations in Taiwan and Japan are also greater than the fitted relationship between return volatility and concentration would predict. These discrepancies can be explained by the speculative boom/crash cycles experienced by these countries during the period of analysis, 1985-91. Finally, it makes sense that low-inflation Germany has lower return volatility than market concentration alone would predict.

Table 12

Volatility of Dollar Returns Compared with Volatility of Local-Currency Returns

Country	Ratio of Standard Deviation of Returns in U S Dollars to Standard Deviation of Returns in Local Currency
Argentina	0 71
Brazil	0 76
Chile	1 03
Mexico	1 07
India	0 99
Korea	1 02
Thailand	1 02
Canada	1 12
France	1 17
Germany	1 16
Italy	1 00
Japan	1 30
United Kingdom	1 15

Sources For the developing countries, data cover 1976-91 and are taken from the International Finance Corporation, Emerging Markets Data Base, for the developed countries, statistics cover 1980-88 and are taken from Sumner Levine, ed., *Global Investing* (Harper Business, 1992), p 30.

[32]Data on greenback-gold exchange rates comes from Wesley C Mitchell, *Gold, Prices, and Wages under the Greenback Standard* (University Press, 1908), pp 288-338

[33]Recall that the first covariance term should be interpreted as the covariance between (a) the rate of appreciation of the greenback relative to the British pound and (b) stock returns in terms of the British pound, and the second covariance term should be interpreted as the covariance between (a) the rate of depreciation of greenbacks relative to the British pound and (b) stock returns in terms of greenbacks

Implications for international investors

The vast changes that have taken place in emerging markets over the past decade have important implications for international investors Developing-country stocks, though volatile, are commonly thought to offer striking diversification benefits because of their impressive historical returns and the low monthly correlations between their returns and developed-country equity returns.[34] The diversification argument, however, is subject to two qualifications The first concerns the use of historical monthly return correlations as indicators of correlation risk, a practice that tends to understate this risk. The second concerns the use of average historical returns as indicators of ex ante returns. This procedure is particularly suspect when applied to emerging markets because many of these markets have undergone important structural changes in recent years

The diversification benefits of emerging market shares are likely to diminish as developing countries become more closely integrated with the global economy and correlations between the equity returns of developing and developed countries increase While the strategy of portfolio diversification through the purchase of emerging market stocks may continue to offer substantial ex ante benefits, these benefits will tend to be more modest than indicated by analyses that employ historical monthly return correlations, which—as we have seen—are likely to underpredict future monthly return correlations

Monthly return correlations also tend to understate the substantial interconnectedness of emerging and developed markets at the longer intervals that are relevant to many investors As documented in an earlier section, correlations between emerging and developed markets tend to increase at intervals longer than one month

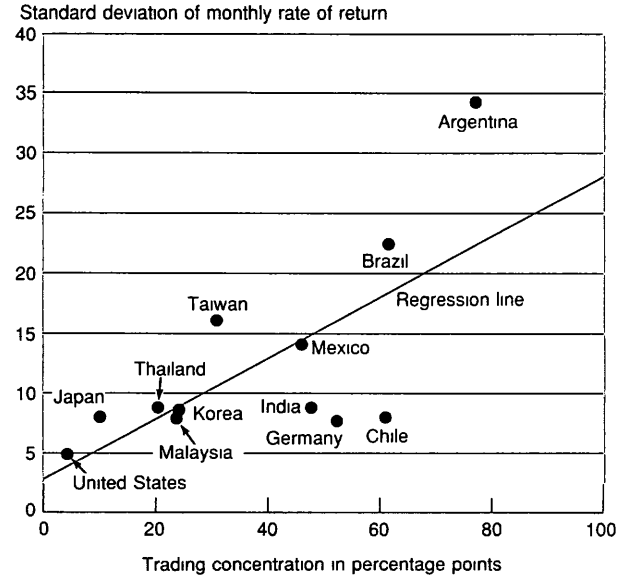
Inferences based on average historical returns can also be problematic. While historical return correlations are likely to underpredict future return correlations, historical return averages are likely to overpredict future return averages. The returns of several of the developing countries under study have been quite extraordinary in recent years Earlier sections of this article showed that these returns have exceeded levels that can be explained by covariance risk and ex post macroeconomic performance; instead, the returns appear to reflect profound changes in economic structure that will probably not be repeated

Historical returns are typically a poor guide for predicting future developing-country equity returns. The IFC total return index for Argentina, for instance, increased at an annualized rate of 100 percent during 1976-79, declined by more than 25 percent per year during 1980-83, and increased by more than 90 percent per year during 1988-91. Returns were unstable during the period because the country underwent several significant regime changes. In fact, most of the countries under consideration experienced significant upheavals during the period. Latin American economies generally boomed in the late 1970s, contracted with the onset of the debt crisis during the early 1980s, and prospered again in the early 1990s with the implementation of economic reforms Taiwan and South Korea each experienced speculative stock market booms during 1986-89 only to see the bottom fall out

In general, it is difficult to form estimates of expected returns based on historical data, and the common practice of using average historical returns to construct expectations of future returns has serious pitfalls. The following example illustrates one of these potential pit-

Chart 9

Trading Concentration and Volatility



Sources International Finance Corporation, Emerging Markets Data Base, *Euromoney 1992 Guide to Equity Markets*

Notes Concentration ratio is the share of turnover attributable to the ten most active stocks in 1991 Standard deviations are calculated over 1985-91

[34]A number of studies have been published in recent years that purport to demonstrate the potential investor gains from diversification into emerging equity markets Three of the more recent examples include Arjun Divecha, Jaime Drach, and Dan Stefek, "Emerging Markets A Quantitative Perspective," Jarrod Wilcox, "Taming Frontier Markets," and Lawrence Speidell and Ross Sappenfield, "Global Diversification in a Shrinking World " All three articles appeared in the *Journal of Portfolio Management*, Fall 1992

falls Divecha and his coauthors make the sensible argument that investing in emerging markets can reduce risk [35] Using data spanning the five-year period from April 1986 to March 1991, they calculate the sample means and variances of portfolios composed partly of a mix of stocks representing the MSCI world index and partly of a mix of stocks representing the IFC composite emerging market index Chart 10 shows their results The portfolio composed entirely of the MSCI stocks had an average monthly return of 0 5 percent and a standard deviation of 5 percent. A portfolio that was 80 percent invested in the MSCI stocks and 20 percent invested in the IFC stocks had an average return of 0.6 percent and a somewhat lower standard deviation

When the time frame of analysis is expanded to the seven-and-a-half year period from January 1985 to July 1992, the return-variance locus moves dramatically. Suppose that an investor is prepared to use sample means, standard deviations, and correlations as proxies for ex ante values The investor's calculation of the increased expected return of taking on an additional unit of risk would be greatly affected by the choice of sample period The trade-off becomes much more favorable when data from the shorter period are used Consequently, the investor's ultimate portfolio allocation may depend significantly on the time frame of analysis

At first glance, the investor's decision to allocate at least 20 percent of wealth to emerging-market stocks does not appear to be very sensitive to the choice of time period When data from either time span are used, emerging market stocks account for roughly 20 percent of the derived minimum-variance portfolio This 20 percent share, however, is not consistent with a capital market equilibrium in which investors hold emerging-market equities in proportion to their current 5 to 6 percent weight in world capitalization The most likely path to such an equilibrium involves increases in share prices and consequent declines in future expected returns as international demand for emerging market stocks increases The problem for investors, of course, is to determine the extent to which recent equity portfolio inflows into emerging markets have already increased share prices and lowered expected future returns.

Conclusion: Emerging equity markets and economic development

Economic reforms in developing countries—including equity market openings, international equity offerings, and policies to stabilize prices and exchange rates—have encouraged large increases in foreign purchases of emerging-market equity shares in recent years. Privatization programs have played a particularly important role in this process, a fact that was underscored by the Argentine government's recent international offering of shares in the Argentine oil company YPF, which raised roughly $3 billion. Together, economic reforms and equity portfolio inflows have helped integrate developing-country equity markets with the global financial system Price linkages between emerging and developed markets have tightened, and as emerging markets have matured, they have come to resemble more closely their developed-country counterparts

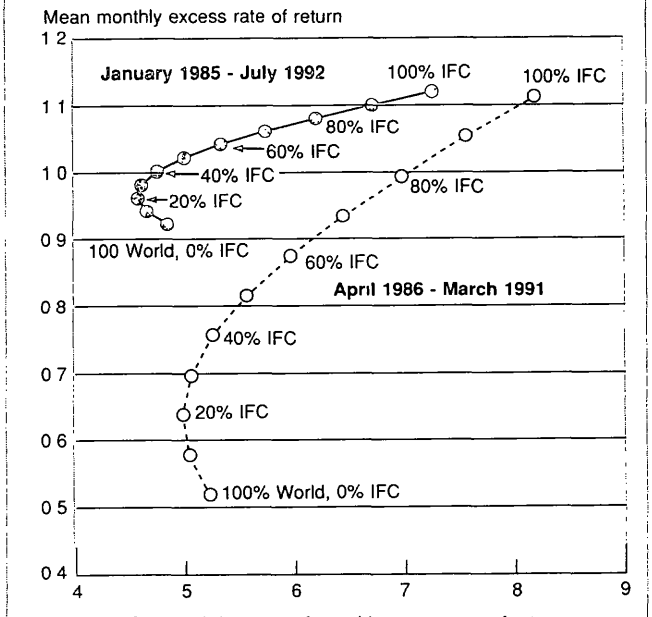
These findings raise the question of the possible contribution of equity markets to economic development In recent years, a number of economists have argued that equity-based financial systems have put the Anglo-Saxon countries at a competitive disadvantage relative to the bank-dominated systems of Japan and Germany.[36] In particular, they have argued that equity-

[35]Divecha, Drach, and Stefek, "Emerging Markets A Quantitative Perspective"

[36]See, for example, Ajit Singh, "The Stock-Market and Economic Development Should Developing Countries Encourage Stock-Markets?" United Nations Conference on Trade and Development, Discussion Paper no 49, October 1992

Chart 10

Gains from Diversification



Sources International Finance Corporation, Emerging Markets Data Base, Morgan Stanley Capital International

based systems tend to discourage long-term investment by producing short-term relationships between firms and their debt and equity holders. Some support for this view may be found in Japan, where investment decisions by firms with close ties to large banks are less sensitive to liquidity constraints than investment decisions by firms with weaker ties to large banks and a presumably greater reliance on credit markets.[37]

This line of argument, however, does not necessarily support the conclusion that developing countries should refrain from promoting equity market development. First, recourse to equity financing does not necessarily preclude equity stakeholders, including financial groups, from taking active and long-term roles in corporate management. Second, if promoting equity markets tends to loosen ties between commercial enterprises and banks, then some advantages may result. Although close relationships between commercial firms and banks may lessen the effects of liquidity constraints on firms' investment decisions, close ties can also increase the degree to which control over industrial activity is concentrated among a relatively small group of agents. And while close ties to a financial group may lessen an individual industrial concern's chances of going bankrupt, this advantage may come at the cost of reducing the economy-wide mobility of productive resources.

Equity markets may emerge as an important alternative to debt-based external finance for developing countries. To be sure, reliance on external financing through either equity portfolio inflows or debt inflows can expose countries to the risk of capital flight or speculative capital outflows. Nevertheless, the substitution of equity portfolio finance for debt finance reduces firms' vulnerability to earnings declines and interest rate increases. Unlike debt-service streams, which are contractually tied to interest rates, common stock dividends can be adjusted with some discretion. At the macroeconomic level, equity finance can help developing countries avoid the excessive reliance on debt accumulation that rendered many of them vulnerable to the interest rate increases of the early 1980s.

This article has shown that equity markets offer developing countries a potentially important source of investment finance. One lesson that the emerging economies of eastern Europe can draw from this experience is that even relative newcomers to the game can raise large amounts of cash through equity issuance, as China did during 1992 when it placed $654 million in shares with international investors.[38] A valuable source of funding awaits those countries that choose to develop their equity markets and encourage equity portfolio investment.

[37]See Takeo Hoshi, Anil Kashyap, and David Scharfstein, "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups," *Quarterly Journal of Economics*, vol 106, no 1 (February 1991), pp. 33-60

[38]Zhi Dong Kan, "Issues of B Shares in Shanghai and the Function of Domestic Securities Companies," *Shanghai Securities Market*, Swiss Bank Corporation, February 1993.