

International portfolio flows and security markets

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Abstract

This paper provides an analysis of the impact of international portfolio flows on security returns. It concludes that opening a country to portfolio flows decreases its cost of capital without adverse effects on its securities markets. There is no convincing evidence that portfolio flows increase the volatility of equity returns or lead to excessive comovement of a country's equity returns with world equity returns. Though there has been much concern that portfolio flows create contagion effects, existing empirical evidence does not provide conclusive evidence that contagion due to uninformed investors is economically important.

For most of the period following World War II, the economic significance of net capital flows was small.¹ Further, net portfolio flows were even less important. Over recent years, net capital flows have become much larger, especially towards developing economies. Further, net portfolio flows are now a major component of net capital flows. In 1996, for instance, net portfolio flows to emerging markets were \$91.7 billion out of net capital flows of \$284.6 billion.² These net portfolio flows were almost evenly divided between equity and debt flows. Portfolio flows were more than twice the net official flows (\$40.8 billion) and were almost three times flows provided by commercial banks (\$34.2 billion). Table 1 compares these numbers to averages over three previous periods. In the first of these periods, stretching from 1977 to 1982, average annual net cumulative portfolio flows to developing countries were negative (-\$10.5 billion). To find a period in history when net portfolio flows were possibly as important, one has to go back to the beginning of this century.

This increased relevance of net portfolio flows results first and foremost from the liberalization of financial markets in developing economies. This liberalization made it possible for investors from developed countries to invest in many countries where previously they could not. As part of the liberalization, many countries engaged in large-scale privatization programs which increased the supply of equity from these countries. Even if investors from developed countries had kept the share of their portfolios invested in emerging markets constant, large net capital flows would have taken place because of the increased capitalization of the emerging markets in which investors can buy securities as a result of the opening of markets and of privatization programs. However, investors also increased the share of their portfolios invested in emerging markets, which led to additional net capital flows. The scope for further liberalization and privatization programs has decreased, but large net capital flows could continue if investors keep increasing their portfolio

¹ See Feldstein and Horioka (1980).

² The 1996 numbers are obtained from World Bank (1997).

Table 1. Net capital flows to developing countries.

Panel A. Capital flows to developing countries from 1977 to 1994 in yearly averages in billion U.S. dollars. (Source: Folkerts-Landau and Ito (1995)).

	1977-1982	1983-1989	1990-1994
Total net capital flows	30.5	8.8	104.9
Net foreign portfolio investment	11.2	13.3	39.1
Net portfolio investment	-10.5	6.5	43.6
Other	29.8	-11.0	22.2

Panel B. Resource flows to emerging markets in billion U.S. dollars. (Source: Campollo-Palmer (1997)).

	1993	1994	1995	1996
Official development finance	55.0	45.7	53.0	40.8
Private debt flows	44.9	44.9	56.7	88.6
Commercial banks	-0.3	11.0	26.5	34.2
Portfolio, bonds & debt	35.9	29.3	28.5	46.1
Portfolio equity	45.0	32.7	32.1	45.7
Foreign direct investment	67.2	83.7	95.5	109.5

allocations to emerging markets. Currently, investors in major developed countries invest less than one percent of their assets in emerging markets. A one percent increase in this allocation corresponds to net capital flows of more than \$120 billion.

This increase in net portfolio flows should lower the cost of capital in many countries and facilitate the flow of capital to firms and countries that have the best investment opportunities irrespective of their location. Overall, this increase in net portfolio flows should be an engine of worldwide growth. This should be even more so because portfolio investment subjects firms and countries to the discipline of capital markets. To attract and keep portfolio investments, firms and countries have to behave so as to maximize the value of these investments and get punished when they do not do so. As a result, firms and countries have greater incentives to invest efficiently. These arguments in favor of unrestrained portfolio flows are powerful, but many argue that they are flawed because investors are sometimes moved by “animal spirits” rather than rational thinking, so that portfolio flows have a dark side which can destabilize countries and reduce growth.

The large net capital flows of the 1990s and the concomitant increase in the role of international investors in developing countries have led many to reconsider the benefits and costs of net portfolio inflows with some urgency. The Mexico crisis has been an important cause of this reconsideration. It has led many to worry about the stability of portfolio investments. Contrasting the Mexico crisis to the debt crisis of the early 1980s highlights why sudden changes in portfolio flows might be a source of concerns. With the debt crisis, there were few key players in developed countries, their claims were illiquid, and they had strong incentives to work out solutions with the developed countries. With the Mexico crisis, coordination among portfolio investors was impossible. Even though collectively investors might have been better off in committing funding to the Mexican government to resolve the crisis, individually each investor was better off by selling out and could do so quickly because he was holding liquid securities. A number of economists have therefore argued

that financing a country's growth through portfolio investment can expose countries to sudden inflows and outflows that can destabilize sound economies, force them into dramatic macroeconomic adjustments, and wreak havoc in their securities markets. After worrying about the insufficient economic importance of net capital flows, some economists now worry that there might be too much portfolio investment. Sachs, Tornell and Velasco (1996) aptly summarize this concern (which they do not share): "In today's world of fickle private capital movements, it is argued, large inflows leave a country exposed to the latest mood of Wall Street traders." (p.171). This leads economists such as Williamson (1993) to say that they "would not urge complete liberalization prior to (a) evidence that (...) controls have become completely ineffective (and hopelessly corrupting), or (b) the assurance that inflows will not be excessive."(p. 14).

In this paper, we examine these concerns about the implications of net portfolio flows in light of the existing empirical evidence and theories of international portfolio investment. In the first section, we evaluate the impact of liberalization on equity valuations and on the cost of capital. In the second section, we address the issue of cross-country comovement in valuations and examine whether there is contagion in international financial markets. In the third section, we consider whether net portfolio flows can drive valuations away from fundamentals and make asset prices more volatile. The final section attempts to provide an assessment of the net benefits of openness to portfolio investment.

Section 1. Capital market liberalization and equity valuations.

The last twenty-five years in the international capital markets have seen the dismantling of the restrictions on capital flows resulting from the two World Wars. At the end of World War II, capital markets were essentially completely segmented. Because of restrictions on capital flows, investors held mostly assets from their home country. International investment took the form of official capital flows. Some restrictions

were soon lifted as currencies became convertible, but other restrictions were added at times as governments in many countries tried to direct economic activity by reducing the role of markets. Since the 1970s, most of these restrictions have been removed. First, the markets of developed economies were deregulated. Countries removed obstacles to exchange rate transactions, agreed to tax agreements that reduced obstacles to international investment, and eliminated restrictions on foreign ownership that were often binding. Developing countries started to deregulate later than the developed countries and many such countries have only taken timid steps in that direction. Nevertheless, many of these countries have eliminated obstacles to capital flows and promoted equity market deregulation actively.

Though economists in general are enthusiastic about the benefits of free trade in goods, they seem often surprisingly reluctant in their assessment of the gains from free trade in securities.³ This is surprising because a country cannot take full advantage of the benefits of free trade in goods without full capital mobility. Capital mobility allows a country to produce more efficiently and enables the residents to bear fewer of the risks associated with domestic production. To understand these two effects of capital mobility, we consider a country with no capital flows that, for the sake of illustration, has a well-defined comparative advantage in producing coffee beans. We then consider the impact on that country of capital flow liberalization.

In the absence of capital flows, a country cannot have net trade flows. Consequently, residents have to bear all the country's risks. If they produce only coffee beans, any shock to the price at which they can sell coffee beans affects the country's income in direct proportion to the size of the crop. Any damage to the crop also affects the country's income directly. Since the price of coffee beans is quite volatile and crop yields can vary unexpectedly, the country's income would be quite volatile if it devoted all its resources to producing

³ Prominent economists have advocated various kinds of taxes to limit international trade in securities to decrease speculative capital flows. See Summers and Summers (1990) and Tobin (1978).

coffee beans. To avoid this volatility, the only solution in the absence of capital flows is to diversify production. This means that the country produces other goods even though it is less efficient at doing so than in producing coffee beans. In the interest of smoothing its income, the country therefore limits the extent to which it takes advantage of the benefits of international trade.

In a country with a market economy, the channel through which production will be directed away from the coffee bean industry is the stock market. In the stock market, investors are rewarded for bearing risk with a risk premium. A stock's risk premium is the expected return of the stock in excess of the return of an investment that has no risk. For instance, the average annual risk premium on the U.S. stock market from 1926 to 1990 is 6.1 percent. Because coffee bean production leads to volatile returns, investors require a high risk premium to invest in that industry and a lower risk premium to invest in industries that provide diversification from the coffee bean industry. As a result, industries that provide diversification from the coffee bean industry are able to obtain capital at low cost. They have to promise lower returns to investors because investing in them reduces portfolio volatility. The low cost of capital in industries that allow investors to diversify the return on their investments makes it possible for these industries to compete successfully against imports. As a result of this diversification effect, the country produces in industries for which it does not have a comparative advantage.

Consider now the impact on that country of allowing unrestricted capital flows and let's assume that there is no dark side to capital flows. Immediately, as investors learn that capital flows will be allowed, the risk premium in the coffee bean industry falls. As investors throughout the world invest in the country's coffee bean production, they find that good events in that industry mostly offset bad events in their portfolio so that investing in coffee bean production actually reduces the risk of their portfolio. This means that the risks associated with coffee bean production are largely diversifiable internationally, so that the world capital

markets require a much smaller risk premium to bear such risks and might require no risk premium at all. As the risk premium for the coffee bean industry falls, the country invests more in that industry. Simultaneously, the local industries that helped residents diversify their coffee bean production risks no longer offer that benefit to residents since residents can diversify internationally. Consequently, these industries may well contemplate an increase in their cost of capital and decrease investment. Once this process is completed, the country becomes more specialized in the industry for which it has a comparative advantage.

To have a better understanding of the transition from complete segmentation to a completely open capital market, it is helpful to use a numerical example. Let's suppose that if the country specializes in coffee bean production, the average annual value of the crop is \$1 billion and the annual volatility is 40 percent. This means that each year there is a five percent probability that the country's income is below \$340m. The country therefore experiences high income volatility. To simplify the discussion, let's assume that all the income accrues to capital. Because of the large volatility, suppose that investors require a risk premium of 10 percent for investments in the coffee bean industry and that the risk-free interest rate is 10 percent. This means that domestic residents are willing to invest in the coffee bean industry only if they expect to earn 20 percent annually, the sum of the risk-free rate that they receive on investments without risk plus the risk premium. The only way they can expect to earn 20 percent annually by investing in coffee bean production is if the value of the industry is the present value of a cash flow stream of \$1 billion a year discounted at the rate of 20 percent. Consequently, the value of the coffee bean industry is \$5 billion. An industry whose revenue does not move with the revenue of the coffee industry would have little risk for an investor heavily invested in the coffee bean industry and that investor would require a low risk premium to invest in that industry. Hence, that industry could raise funds promising an expected return to investors close to 10 percent. A dollar of annual average income from that industry is therefore worth \$10.

Consider now the impact of an extremely successful liberalization, so that the risk of the production of coffee becomes a risk diversified in portfolios throughout the world. The risk premium on the coffee industry almost disappears, so that the present value of the perpetuity of \$1 billion is now worth close to \$10 billion. In other words, liberalization has a dramatic effect on the equity market capitalization. At the same time, however, the diversifying industry might now face a risk premium of five percent, so that its cost of capital increases from 10 percent to 15 percent. A dollar of average income in that industry falls from \$10 to slightly more than \$6. As with trade liberalization, not everybody benefits from capital market liberalization. However, as with trade liberalization, those who gain can compensate those who lose in such a way that everybody is made better off.

The decrease in the cost of capital has three effects on the coffee industry. First, it increases the value of the expected cash flows from existing investments since these expected cash flows are discounted at a lower rate. Second, it makes investments profitable that were not profitable at the higher cost of capital. Thus, there will be an investment boom in the coffee industry. The third effect is that new investors will come to the industry and monitor firms in that industry. These investors will have new ideas and will want to influence the actions of firms to make sure that their investments are profitable. Foreign investors will therefore improve corporate governance in the coffee industry, which will increase the value of the industry.

Our analysis of opening up securities markets in a country has three empirical implications: (1) foreign investors acquire domestic securities; (2) domestic valuations increase; (3) the cost of capital falls. We now consider the empirical evidence on these three implications. We focus on capital account liberalizations in developing economies both because of their intrinsic interest and because they constitute well-defined events.

- **Liberalization and foreign investment.**

Our analysis of liberalization assumes that foreign investors invest in the liberalized market rapidly. If this does not happen, no risk-sharing takes place and asset prices do not increase. It is well-known that the holdings of foreign securities are small within portfolios of investors in developed countries.⁴ Consequently, most of a developed country's equity is held by domestic residents. For instance, according to the NYSE 1996 Fact Book, U.S. investors held about 94 percent of U.S. equity at the end of the third quarter of 1996 (p. 59). This so-called home bias in portfolios implies that, even though portfolio flows have been large, domestic investors still have to bear a large fraction of the risks associated with domestic production. This limits the extent to which the cost of capital falls following liberalization.

Empirically, portfolio flows grow significantly as liberalization occurs. Kim and Singal (1993) document that initially following liberalization there is a short period of net capital outflows; quickly, however, net capital flows turn positive and become large. Yet, this effect varies across countries. Liberalizations differ in degree across countries dramatically, so that it is not surprising that foreign investors build larger stakes in some countries than in others. Table 2 provides estimates of U.S. equity investment and foreign equity investment in a number of emerging markets. For most countries, foreign ownership is difficult to estimate precisely. The table shows this vividly for Venezuela where the estimate of U.S. ownership exceeds the estimate of foreign ownership! Nevertheless, these numbers show that, on average, liberalization leads to substantial foreign equity holdings. These foreign equity holdings are generally large compared to foreign equity holdings in the U.S. Consequently, the home bias has a somewhat different meaning for developing economies than for large developed economies. Because the capitalization of emerging markets is small, an investment corresponding to a small fraction of the capitalization of U.S. markets represents a large fraction of many

⁴ See Cooper and Kaplanis (1994), French and Poterba (1991), and Tesar and Werner (1994).

Table 2. Estimates of U.S. and foreign ownership for selected emerging markets.

The estimates of U.S. ownership are from Bekaert and Harvey (1997a) who cumulate flow of funds data until the end of 1995. The estimates of foreign ownership are from Campollo-Palmer (1997).

	U.S. ownership as percent of market capitalization	Foreign ownership as percent of market capitalization
Argentina	20%	38%
Brazil	6	
Chile	4	17
Columbia	6	7
China		6
India	2	
Indonesia	6	
Malaysia	1	
Mexico	21	25
Peru		38
Thailand	6	
Venezuela	43	36

emerging markets. One way to understand this is that Bill Gates could buy all the equity of Greece, Hungary, Jordan, Nigeria, Poland, Sri Lanka, Venezuela and Zimbabwe - and still have \$7 billion left to invest elsewhere.

- **Estimates of the increase in valuations resulting from liberalization.**

With our example, the capital market liberalization induces an increase in equity valuations and a decrease in the cost of capital which leads to an increase in investment. Because of the home bias, the economic importance of these effects of liberalization is an empirical issue. It is relatively straightforward to look at stock market returns and evaluate whether they are unusually high at the time that a country liberalizes. We will see that it is harder to figure out whether the cost of capital falls.

The large returns on emerging markets over the last fifteen years are well-known. For instance, from December 1984 to December 1994 the real value of emerging market equity increased by 202 percent; in comparison, the S&P 500 increased by 93.5 percent. These large returns are in part responsible for the interest of portfolio managers in these markets. Since so many liberalizations took place during that period, the performance of emerging markets is consistent with the theoretical prediction of increases in equity valuations accompanying stock market liberalization. However, stock market valuations are not affected by liberalization of capital flows only. Liberalization of capital flows is often accompanied by other events affecting the economy that liberalizes. For instance, the economy might have a new political regime that is market oriented and undertake extensive domestic reforms that increase stock market valuations. Also, the performance of the stock market depends on how the economy is performing, so that macroeconomic conditions have to be taken into account.

To assess the effect of liberalization on equity valuations, it is therefore important to pay close attention to other events that take place in the country that liberalizes its markets. This task is made more

difficult by the fact that liberalization is rarely a one-shot event. Countries liberalize some aspects of their markets at one time and others at some other time. Henry (1997a) painstakingly identifies individual economic reform and capital flow liberalization events that affect twelve emerging markets. Presumably, by the time the liberalization takes place, its effects are already incorporated in stock prices because investors have been aware of it for some time. It turns out that for the seven months preceding the first liberalization, equity returns adjusting for world market equity returns are of the order of 40 percent. However, once Henry (1997a) controls for other events that affect these economies and for macroeconomic conditions, he concludes that the effect is of the order of 18 percent. He finds an effect of 16 percent for subsequent liberalizations. This suggests a cumulative effect of about 37 percent.

- **The impact of liberalization on the cost of capital.**

The evidence of Henry (1997a) shows that capital flow liberalization has a large effect on equity valuations. In our earlier analysis, we argued that liberalization by reducing the cost of capital can have such an effect. The question that arises out of Henry's evidence is how large the impact of liberalization is on the cost of capital. Suppose that the reevaluation effect is 37 percent. In this case, the reevaluation takes \$ 1 invested in a market and brings it to \$1.37. This reevaluation captures all the effects of the liberalization discussed earlier. Since the decrease in the cost of capital also makes new investments profitable, the \$0.37 reevaluation is an upper bound on the impact of the decrease in the cost of capital. This upper-bound implies that a country where the cost of capital for a project of typical risk was 20 percent now has a cost of capital of no less than 16.6 percent. In other words, the cost of capital of that country falls at most by 17 percent. One would expect such an effect to increase investment. In another paper, Henry (1997b) shows that liberalization induces an increase of 23 percent in private investment the year following liberalization and an increase of 24

percent the year after that. He also finds that his estimate of the stock market effect of liberalization helps predict the increase in investment following liberalization.

The sharp stock market increase associated with liberalization suggests that it might be straightforward to measure directly the impact of liberalization on the cost of capital. It turns out that this is not an easy task. The equity cost of capital is the expected return that investors anticipate from equity investments. As this cost falls, entrepreneurs can raise more funds for a project. Measuring the return that investors expect on equity is a difficult undertaking. One might be tempted to use past returns to forecast future returns. However, this strategy is not possible in the case of markets that undergo a liberalization. For such markets, the past returns are those appropriate for the segmented economy that no longer exists following liberalization. To complicate things further, past average returns for such markets are high for two reasons. First, segmented markets have higher risk premia because domestic investors have to hold more domestic equity than they would in the absence of segmentation. Second, as discussed, liberalization boosts equity valuations as the cost of capital falls. Hence, the prospect of lower expected returns on equity has the paradoxical implication of increasing average returns of equity when measured over the liberalization period. This is because the expected cash flows of equity are discounted at a lower rate.

A second strategy to estimate the change in the cost of capital is to assume that following liberalization the expected return is determined by how the risk of equity is priced in global markets. To do this, one has to posit a model of how risk is priced in global markets and one has to assume that this model applies to equities of liberalized markets. For such an approach to make sense, one has to believe that it is reasonable to treat the world as if liberalized markets form one big market where capital flows freely across markets to equalize risk-adjusted returns. To proceed further, we therefore have to consider whether it is reasonable to think of the world of liberalized markets as one big market.

If investors can move capital freely across countries, they can diversify their portfolios internationally. This means that risks which are specific to small countries typically do not matter much in their portfolios. If their investments in one small country do poorly because of events specific to that country, their investments in another small country might be doing well. On balance, therefore, these risks offset each other. By diversifying internationally, investors can form a portfolio that has a lower volatility for a given expected return. Since investors would rather bear less risk than more, they should prefer this strategy. A reasonable measure of the gain that American investors can make by diversifying internationally is provided in a forthcoming paper by DeSantis and Gerard (1997). They show that as of 1994 a portfolio diversified internationally among 10 major developed economies had the same volatility as a well-diversified portfolio of American equities with an annual expected return higher by about 2.5 percent. Adding emerging markets to this portfolio would lead to further gains from diversification. For a portfolio to be well-diversified internationally, however, its holdings have to be the same proportion of the capitalization of the securities in each country. A portfolio that holds the same proportion of the capitalization of each security in the world is called the world market portfolio. Hence, since emerging markets represent about 12 percent of world market capitalization, a well-diversified portfolio has an investment of about 12 percent in emerging markets.

An investor who holds a portfolio that is well-diversified internationally measures the risk of a security by its contribution to the volatility of that portfolio. As the volatility of her portfolio increases, she bears more risk. Hence, she is only willing to hold a security that contributes significantly to the volatility of the portfolio if she receives enough of a reward in the form of a risk premium. A security contributes more to the volatility of her portfolio if that security moves more together with the other securities in the portfolio. Comovement reduces the diversification benefit from holding a security since, if the portfolio performs poorly, that security is highly likely to perform poorly also. A security can have high volatility and yet have little comovement with

the portfolio. The investor will not be concerned about the volatility of such a security because most of the randomness of its return will be diversified away in the portfolio.

The part of the return of a security that cannot be diversified away is the one that moves with the return of the whole portfolio. Financial economists call this part of the return of a security its systematic risk. A simple model of the risk of securities in markets where capital flows freely is the international capital asset pricing model, which states that the return of a security in excess of the risk-free rate is equal to the systematic risk of that security times the risk premium on the world market portfolio.⁵ The measure of the systematic risk of a security for a well-diversified investor is the degree to which it moves with the world market portfolio. For instance, if the world market portfolio has a one percent return, one can expect the U.S. market portfolio to have a 0.84 percent return but the Argentinian market portfolio to increase by 0.19 percent.⁶ Consequently, the U.S. market portfolio has substantially more systematic risk than the market portfolio from Argentina and should earn a higher expected return. A security which covaries more with the world market portfolio must promise investors a higher expected return because it has more risk that investors cannot diversify away. With this model, the equity cost of capital is equal to the risk-free interest rate plus the systematic risk of the security times the risk premium of the world market portfolio. If we take the risk premium of the world market portfolio to be six percent, the Argentinian market portfolio would be expected to earn 1.14 percent in excess of the risk-free rate and the U.S. market portfolio 5.4 percent.

The international capital asset pricing model has been tested extensively with some degree of success, especially among developed countries. There is clear evidence that the returns of securities are related to their systematic risk. Countries whose markets covary more with the world market have higher equity returns on

⁵ See Stulz (1995) for a detailed analysis of the theory and its empirical tests.

⁶ These estimates are from Erb, Harvey and Viskanta (1996).

average as predicted. At the same time, however, such a simple model has limitations. There are regularities that it cannot explain. For instance, it understates the required return from small firms and tends to overstate the required return from growth firms. Part of the difficulties of the model is that countries still have obstacles to capital flows. Nevertheless, the clear lesson from the empirical evidence is that, for countries whose capital markets are fairly open, the primary determinant of the valuation of securities is their risk as measured on the international capital markets.

Like Argentina, most emerging markets have little systematic risk. As these markets liberalize, the valuations of their securities become more determined on the international capital markets and increase because these securities have little systematic risk. It is not the case, however, that these markets become completely integrated in world markets as soon as they liberalize. Liberalizations are generally partial and there is always a risk that a country will adopt new restrictions on capital flows. Hence, the expected returns on emerging market common stocks are best described as a mix between expected returns determined on world markets and expected returns determined on local markets, with the mix changing over time.⁷ If liberalizations were complete and credible and if there was no home bias, liberalizations would have a more dramatic effect on stock returns. Going back to our example where we argued that the empirical evidence suggests a fall of the cost of capital of 17 percent, one would expect the cost of capital to fall from 20 percent to about 10 percent rather than to 16.66 percent if the liberalized market became completely integrated in the world capital markets. In this case, a liberalization would more than double equity valuations.

One last point should be made. As investors become better able to diversify their portfolios internationally, they bear less risk. If investors require more compensation to bear more risk, this means that the compensation for risk falls. Hence, greater globalization of capital markets implies a fall in the cost of

⁷ See Bekaert and Harvey (1995) for an empirical analysis of this process.

capital everywhere because the risk premium on the world market portfolio falls.

Section 2. Do changes in one market cause changes in another market?

With free capital flows, markets are connected. Investors who think that one market will have higher returns can move their investments to that market. Some have argued that this connection implies that markets move more together than they would if they were segmented. As investor sentiment changes in one large country, they argue, this change affects stock returns throughout the world irrespective of fundamentals. This view suggests that stock moves are contagious. To evaluate this claim, it is important to understand what moves stock prices. In the previous section, we thought of stock prices as the present value of cash flows. Consequently, stock prices can change because the expected cash flows change or because of changes in discount rates. The discount rate is the risk-free rate plus a risk premium. This means that the discount rate can change because of interest rates or risk premia.

In global markets, the risk premium is determined globally. For instance, the risk premium on U.S. stocks is not determined in the U.S. alone. Chan, Karolyi and Stulz (1992) document that the risk premium on U.S. stocks and the risk premium on Japanese stocks are clearly connected, so that changes in the risk premium on Japanese stocks also affect the risk premium on U.S. stocks. This effect naturally induces comovements in stock prices across the world and it does not imply that investors are irrational or that stock prices disregard economic fundamentals. It does mean, however, that U.S. stock prices can change in circumstances where, if the U.S. was an isolated country, they would not change. We now examine stock price co-movements and whether they have changed as capital flows became less restricted.

- **Have co-movements increased over time?**

Much of the analysis of stock price co-movements has focused on one measure of co-movement, namely the correlation of stock returns, which takes values between -1 and +1. Typically, well-diversified portfolios of U.S. stocks have a correlation close to one. Historically, however, correlations of foreign indices with the U.S. market have been small, especially for emerging markets where they often have been indistinguishable from zero. At the same time, though, these correlations change over time. This makes it difficult to figure out whether correlations are greater now than they used to be. This task is further complicated by the fact that these correlations are not well-understood. Although many authors have tried to explain how they change over time and how they differ across countries, this literature has had little success. Table 3 provides a comparison of correlations of stock markets with the world market portfolio over two periods. One period is the sample period for which returns were available. The other period corresponds to the first five years in the 1990s. Correlations have changed, but some increased and others decreased. The average correlation is 0.35 for the whole sample period and 0.41 for the most recent five years. Hence, on average, correlations increased, but not by much.

Many recent papers have looked at the issue of whether correlations have increased over time using sophisticated statistical techniques.⁸ There is evidence of an increase in correlations, but the extent of this increase differs across studies and some studies do not report an increase. One important issue that affects the conclusions of the existing studies is that some include the Crash of 1987 and others do not. Over a short period of time in 1987, markets moved together by extremely large amounts. Including data from that period has the effect of increasing correlations. Hence one's conclusion about the evolution of correlations depends on whether or not one takes into account the Crash. DeSantis and Gerard (1997) examine the correlation between

⁸ See Karolyi and Stulz (1996) for references.

Table 3. Correlations between countries and the world market portfolio (MSCI).

Source: Erb, Harvey and Viskanta (1996).

Country	Source	Sample Start	Correlation		Country	Source	Sample Start	Correlation	
			Full Sample	Last Five Years				Full Sample	Last Five Years
Argentina	IFC	October 1979	-0.01	0.12	Malaysia	IFC	October 1985	0.41	0.47
Australia	MSCI	October 1979	0.52	0.49	Mexico	IFC	October 1979	0.24	0.29
Austria	MSCI	October 1979	0.30	0.54	Netherlands	MSCI	October 1979	0.75	0.77
Belgium	MSCI	October 1979	0.62	0.72	New Zealand	MSCI	April 1988	0.39	0.56
Brazil	IFC	October 1979	0.09	0.19	Portugal	IFC	October 1986	0.41	0.62
Canada	MSCI	October 1979	0.69	0.55	Singapore	MSCI	October 1979	0.53	0.70
Chile	IFC	October 1979	0.07	0.12	South Africa	IFC	April 1993	0.33	0.33
China	IFC	April 1993	0.05	0.05	South Korea	IFC	October 1979	0.23	0.35
Colombia	IFC	October 1985	0.06	0.08	Spain	MSCI	October 1979	0.56	0.71
Denmark	MSCI	October 1979	0.51	0.63	Sri Lanka	IFC	April 1993	0.01	0.01
Finland	MSCI	April 1988	0.47	0.51	Sweden	MSCI	October 1979	0.59	0.72
France	MSCI	October 1979	0.65	0.73	Switzerland	MSCI	October 1979	0.69	0.78
Germany	MSCI	October 1979	0.56	0.66	Taiwan	IFC	October 1985	0.22	0.33
Greece	IFC	October 1979	0.17	0.18	Thailand	IFC	October 1979	0.27	0.34
Hong Kong	MSCI	October 1979	0.43	0.47	Turkey	IFC	October 1987	0.06	0.05
Hungary	IFC	April 1993	0.45	0.45	United Kingdom	MSCI	October 1979	0.76	0.80
India	IFC	October 1979	-0.05	-0.16	United States	MSCI	October 1979	0.77	0.70
Indonesia	IFC	October 1990	0.12	0.25	Venezuela	IFC	October 1985	-0.08	-0.02
Ireland	MSCI	April 1988	0.69	0.77	Zimbabwe	IFC	October 1979	0.08	0.11
Italy	MSCI	October 1979	0.47	0.44					
Japan	MSCI	October 1979	0.74	0.83					
Jordan	IFC	October 1979	0.13	0.20					

the U.S. market and an equally-weighted portfolio of nine other large developed markets. They use a statistical model to estimate monthly correlations. Their sample period is January 1970 through December 1994. The twenty lowest correlation estimates are all before 1980. Sixteen of the twenty largest correlations are after 1980. Their evidence shows that there is high correlation in periods of extremely low stock returns. Their average correlation is 0.56. However, the S&P 500 dropped by 29.42 percent from September to November 1987. They report their highest correlation, 0.76, for that period. The second highest correlation they report is during the period from January 1973 to September 1974 when the stock market dropped 45.06 percent. There is now considerable evidence that correlations are high when markets are highly volatile and especially so during bear markets. It is difficult to attribute this to liberalization since correlations were high during the bear market of the 1970s also.

What about correlations for emerging markets? In table 3, the average correlation for the emerging markets is 0.17 for the whole sample period, which is roughly half the average correlation for all countries and confirms that emerging markets have much lower correlations with the world market portfolio than developed economies. For 1990-1995, the average correlation for the emerging markets is 0.22, which is still close to half the correlation for the whole sample. There is therefore an increase in correlations of emerging markets, but correlations among developed markets increased proportionally by roughly the same amount. In an interesting paper, DeSantis (1993) looks at the correlations of markets in the World Bank's emerging markets database over two periods. The first period is from 1976 to 1984 and the second from 1984 to 1992. He finds that the average correlation is essentially the same for these two sub-periods. Looking at the correlation of the U.S. with these markets, he finds a slight increase. The average is a trivial 0.038 for the first subperiod and 0.132 for the second subperiod. The second subperiod contains the Crash of 1987, however. Again, this evidence suggests a slight increase in correlations, but the increase seems slight enough that some might conclude there is no change. In a recent study, Bekaert and Harvey (1997b) estimate a model that allows correlations between

emerging markets and the world market to change over time. They then estimate correlations before and after liberalization. Out of 17 emerging markets, they find the correlation with the world market to be higher for 9 markets. This result seems to provide, at best, weak evidence that correlations increase after liberalization.

Though there is little evidence of strong increases in equity returns correlations, there is evidence of dramatic increases in correlations between bond yields. Goldstein and Folkerts-Landau (1994) provide correlations between 10-year yields in the seven largest developed economies and the U.S. ten-year bond yield. For the period from 1970 to 1979, the average monthly correlation excluding Canada is 0.41. This average correlation increases to 0.86 from 1980 to 1989 and 0.88 from 1990 to 1994. Illmanen (1995) provides evidence that there is a strong common factor in interest rate movements across developed countries. One view of this increase in correlations is that, as markets become more integrated, investors give little room to monetary authorities to pursue policies that lead to sharply divergent interest rate movements. It is unclear, however, why the growing integration of markets would affect nominal yields rather than expected real yields.

- **Is there causation?**

Many papers have been written trying to identify whether stock price changes in one market lead to stock price changes in another market. Initially, this research used monthly or weekly data. However, it quickly became apparent that such research is difficult to interpret. If prices adjust very quickly, there is little hope of finding relationships using infrequently measured data. If a shock to U.S. prices is transmitted to the rest of the world within twenty-four hours, this transmission is obscured by using monthly data. Weekly or monthly data might yield spurious effects, however. Not all stocks trade as frequently. Infrequent trading of some stocks can give the impression that one market leads another. To see this, suppose that the U.S. stock market drops by 20 percent during one month and one looks at whether this knowledge helps understand the return on foreign

markets the following month. One would expect foreign stocks to fall contemporaneously to the extent that the U.S. stock market drop is brought about by some adverse event that affects the whole world. For instance, there could be bad news about the U.S. economy which would reduce equity values throughout the world to some extent since firms would not be able to sell as much to the U.S. as expected. However, if some foreign stocks trade infrequently, the bad news effect on their prices will be recorded only when they trade. Hence, if some foreign stocks do not trade when bad news occurs, they will record a drop subsequently to the drop in the U.S., leading to the wrong impression that the U.S. drop caused the drop abroad, when in fact both drops were caused by the bad news.

The difficulty of interpreting results using weekly and monthly returns has led to the use of data of much higher frequency. Some of this research focuses on returns for periods when stock markets are open and periods when they are closed. Other research measures returns over even shorter periods of time. The opening hours for the U.S. and Japanese stock markets do not overlap. Over a twenty-four hour period, the Japanese market opens first and closes before the U.S. stock markets ever open. Japanese returns contain information about U.S. stock returns because the markets are correlated. A rough estimate is that a 10 percent increase in Japanese markets on average corresponds to a 3 percent increase in U.S. markets. However, all the information contained in the Japanese return during trading hours should be incorporated in U.S. stock prices at the time that the market opens in the U.S. This means that the 10 percent Japanese market increase of our example should have no information about the U.S. market return during the U.S. trading day. The evidence is that most of the effect of the 10 percent Japanese market increase is incorporated in U.S. stock prices by the time the market opens.

This research has also examined whether unexpected increases in volatility spill over across markets. The question asked is whether unexpectedly high volatility in the U.S. when the U.S. market is open leads to high volatility in Japan. This seems to be the case. It seems further that this effect is symmetric across the world

- the U.S. unexpected volatility leads to higher volatility in Japan and the Japanese unexpected volatility leads to higher volatility in the U.S. One might be tempted to attribute this volatility spillover to the increased flow of capital and hence to the greater connections across markets. However, this literature finds greater evidence of spillovers on data before the Crash of 1987 than on later data. One possible explanation is that much of the spillover effects documented in the literature were spurious, having to do with infrequent trading. There is substantial evidence that after the Crash information gets incorporated in prices much faster, at least in the U.S.

The problem with both the returns and the volatility evidence is that it is consistent with two hypotheses that have dramatically different implications for the efficiency of financial markets. One hypothesis is that there are common components to the Japanese and the U.S. market and spillovers reflect these common components. With this hypothesis, spillovers show that markets incorporate information efficiently. The second hypothesis is that spillovers are the work of uninformed investors who overreact to news in one market, corresponding to a change in sentiment.⁹ They become more risk-averse following bad news and less risk-averse following good news, regardless of fundamentals of their own market. With this view, there is irrational contagion. The lack of spillover reversals is evidence against the uninformed investors hypothesis. Lin and Ito (1994) devise an additional test that makes it possible to distinguish between the two hypotheses. They point out that uninformed traders who become more or less risk-averse trade to change their portfolios. Consequently, strong spillovers should be associated with high volume. They find no such evidence and argue that the evidence is more consistent with the view that markets impound information efficiently.

- **Contagion and crises.**

We saw in the previous paragraph that there seems to be little evidence of contagion among developed

⁹ DeLong, Shleifer, Summers and Waldman (1990) develop a theory of uninformed investors moved by sentiment and show that such investors can affect asset prices in equilibrium.

markets under normal circumstances. However, we know that there are greater comovements in bear markets. This could mean that there is contagion when it might be most damaging, namely in periods of turmoil. There has been much discussion of contagion among emerging markets during the Mexican crisis. Some have used this contagion to justify the help given to the Mexican government in 1994. For instance, Fisher states that “Of course, there was another justification: contagion effects. They were there and they were substantial.”¹⁰ Table 4 shows the performance of some emerging markets during January 1995. During that period, the markets performed poorly. Further, as documented in Calvo and Reinhart (1997), correlations among Latin American markets equities and Brady bonds increased sharply around the crisis. Many have interpreted this as evidence of a contagion effect of the Mexican crisis. The view is that as Mexico fell into its crisis, investors reassessed the prospects of emerging markets and grew pessimistic even when there was no basis to do so. Flows to emerging markets slowed down markedly immediately after the Mexican crisis, so that some have argued that this slowing down was responsible for price drops. In the remainder of this section, we first discuss the economics of contagion and then examine some empirical evidence of the economic importance of contagion associated with the Mexican crisis.

The traditional view of contagion has to do with banking panics. The idea is that a bank fails and depositors start withdrawing funds from other banks which are healthy, thereby weakening these banks. For emerging markets, the reasoning is similar, namely that a shock in one market leads investors to withdraw funds from other markets because of irrational fears. It is certainly the case that some investors behaved that way. Stories of specific investors making obvious mistakes in their analysis of emerging markets have often been repeated.¹¹ Though such stories enliven conferences, they are irrelevant for an assessment of contagion. Market prices are the product of the actions of all investors and the important question is whether aggregate outcomes

¹⁰ See his statement in Calvo, Goldstein, and Hochreiter (1997), p.323.

¹¹ See, for instance, Wadhvani’s comment in Calvo, Goldstein, and Hochreiter (1997).

Table 4. Returns on major indices during January 1995.

Source: Khannah (1996).

Mexico	-22.2%
Peru	-19.2
Brazil	-10.2
Chile	-6.9
Argentina	-5.8
Hungary	-21.1
Poland	-13
Turkey	-12.9
Pakistan	-13.4
Philippines	-13.2
China	-12.5
India	-12.2
Taiwan	-11.3
Hong Kong	-10.3
Thailand	-10.3
Malaysia	-9.2
Indonesia	-8.4
Singapore	-6.5
Sri Lanka	-2.3

are efficient. One would expect other investors to take advantage of the opportunities created by investors who panic. Hence, if there is plenty of arbitrage capital, contagion should not be a problem.

Unfortunately, the investment industry is organized in such a way that arbitrage capital to be used to take advantage of mispricings in emerging markets may be artificially scarce. Most investments in emerging markets are made by institutional investors. Typically, these investments are made because sponsors and clients designate emerging markets as an asset class in which they want to put funds. The investment industry responds to the demand for investment vehicles in an asset class by creating mutual funds and other investment vehicles. Consider now how institutional investors can react to lower stock prices brought about by panic selling from uninformed investors. Institutional investors who are not specialized to the emerging market asset class will find it difficult to suddenly start investing in emerging markets to take advantage of investment opportunities resulting from panicky investors. Institutional investors who are specialized to the asset class face a situation where their resources are weakened by the adverse shock that starts the contagion process and where they may find it difficult to liquidate assets to generate cash to exploit advantageous investment opportunities because of turmoil in the markets. Consequently, few institutional investors may be able to take advantage of the investment opportunities created by the actions of the uninformed investors. This lack of arbitrage capital creates a situation where valuations depend on the capital committed to an asset class and can create discrepancies between valuations across asset classes. For instance, Gompers and Lerner (1997) show that valuations in the venture capital industry depend on the funds committed to the industry.

The institutional investors specialized in emerging markets face an additional problem that further limits their ability to take advantage of investment opportunities during periods of turmoil, namely withdrawals of funds by clients. Shleifer and Vishny (1997) argue cogently that clients of institutional investors may not be able to assess easily whether an investment strategy is right and may therefore use short-term returns to guide their investment decisions. For instance, it may be quite difficult for the typical pension fund organization

to assess the performance of an asset manager specialized in emerging markets. The manager may have a solid economic argument which explains why current valuations are too low and that the best solution is to keep the portfolio unchanged. However, the client may find it difficult to assess whether this argument is correct or not and may simply change her allocation of funds to the manager based on his recent performance. Consequently, an institutional investor who thinks that stock prices are too low in a particular country may not be able to act on his judgement if his portfolio has done poorly because funds are being withdrawn. In fact, institutional investors may be forced by the circumstances to aggravate the contagion rather than exploit it. Facing redemptions, they may have to liquidate assets in healthy countries because those markets are liquid and may therefore adversely affect capital flows in these countries. What creates the contagion in this case, however, is not an excess of speculative capital. Rather, it is that there is an insufficient amount of arbitrage capital devoted to an asset class. The contagion arises because of a lack of investors who can provide liquidity to the institutional investors forced to withdraw from a country. Hence, leaders of emerging countries should not complain about the actions of hedge fund managers, but rather should complain that there are too few hedge funds. As more institutional investors become authorized to shift funds between developed and emerging markets and across emerging markets, the possibility of contagion induced by forced liquidations of some institutional investors should disappear.

Contagion caused by panicky investors and forced liquidations is self-limiting in equity markets. As prices fall, it becomes more advantageous to hold on to a non-investment rather than liquidate it. However, in debt markets, the situation is more delicate for those who rely on short-term debt. If investors are reluctant to roll the debt over, promising higher yields may not solve the problem because these higher yields may imply too high a probability of default. As a result, a country or a firm might face a liquidity crisis and be forced to decrease investment because of being cut off from public markets. Obviously, firms and countries that find themselves in such situations have chosen an imprudent financing policy. Financing with short-term debt

amounts to betting that one's credit will not deteriorate. Sometimes it does. When it does, those that finance with short-term debt face problems whether the change in the perception of credit quality is driven by contagion or not. If the change in credit quality is driven by poor economic prospects for a firm or a country, they should contract investment. However, if economic fundamentals are solid, contraction is not appropriate. Unfortunately, contagion can lead to costly liquidation of investments that represents a waste of resources.

When there are few creditors, they can get together and realize that the appropriate solution to a liquidity crisis is to restructure the debt. By doing this, the creditors make it more likely that they will be paid back. When there is a large number of creditors, this coordination is no longer possible. A provider of liquidity of last resort can solve the problem by providing temporary loans. However, the existence of such a provider may lead to the problem in the first place. In the absence of such a provider, different funding strategies would be used to reduce the risk of a liquidity crisis. The existence of a provider of liquidity of last resort may also aggravate contagion. Presumably, the provider has limited resources; if these resources are deployed to help one country, this means that they are not available to other countries. Consequently, a crisis in one country reduces the credit of the other countries that might need the help of the provider of liquidity of last resort.

Empirical evidence by Calvo and Reinhart (1997) shows that the capital account of developing economies is negatively related to the U.S. ex post real rate of interest. This shows that there is a common factor in these capital accounts. The existence of common factors is not, however, evidence of irrational contagion. In the absence of a careful model which shows what the capital account of these economies would be in the absence of contagion, there is no way that correlations among capital accounts caused by the existence of common factors can be attributed to contagion. For instance, historically the U.S. stock market increases when interest rates fall. It could be perfectly rational for U.S. investors to invest more in developing economies when their wealth increases.

Contagion does not require changes in capital flows to sharply decrease the values of financial assets.

This is because public information affects stock prices without trades in stocks. To see this, consider the Mexican crisis. All investors could observe the events taking place. Given that an adverse event has taken place, investors will not buy stocks at the prices prevailing before the event. On average, one would expect the price of the first trade taking place after the event to incorporate the information revealed by the event. At the very least, equity prices would reflect the event very quickly and there is no reason for massive sales to take place for equity prices to reach their new value. If the stock price adjustment process is quick, it is very difficult to provide evidence that information in one country caused markets in other countries to change value irrespective of fundamentals by trying to show that the change in one country preceded the other.

Using stock returns measured over short intervals of time is one way to understand whether the contagion associated with the Mexican crisis is important. A recent study by Bailey, Chan and Chung (1997) investigates the relation between changes in the peso-dollar exchange rate at half-hour intervals from December 21, 1994, to April 30, 1995 and the returns of Asian and Latin American ADRs on the NYSE and country funds on the same exchange. They estimate the relation between the half-hour change on a stock and the contemporaneous change in the peso exchange rate as well as the change in the previous half hour. Not surprisingly, they find a strong contemporaneous relation between the Mexican ADRs and the peso exchange rate, as well as a strong lagged relationship. However, they also find that a depreciation of the peso during a half hour has a significant adverse effect on Non-Mexican Latin American ADRs for the same period as well as for the next period. Essentially, a one percent depreciation of the peso is associated with a negative return of Non-Mexican Latin American ADRs of -0.15 percent. There is no effect on Asian ADRs. Looking at closed-end funds, they find a small but significant effect of peso depreciation on Asian country funds and a stronger effect on Non-Mexican Latin-American country funds. A one percent depreciation of the peso is estimated to reduce the value of Asian country funds by 0.03 percent and the value of Non-Mexican Latin American country funds by 0.18 percent. They also explore the impact of the intensity of news announcements on the volatility

of ADRs and country funds. Again, they find that Non-Mexican Latin American ADRs and country funds experience larger absolute returns when there is news about Mexico during a half hour.

The evidence in Bailey, Chan and Chung (1997) provides evidence of a Tequila effect on the NYSE. Unfortunately, the paper does not attempt to assess how much of the effect is due to information effects and how much is explained by the panic of uninformed investors. Lin and Ito (1994) in the paper discussed earlier in this section argue that contagion associated with stock price decreases implies that high correlations are associated with high volume because uninformed investors liquidate their positions. Bailey, Chan and Chung (1997) provide evidence that can be used to check whether contagion due to uninformed investors was important. They show that news about the Mexican peso and other Mexican news had a strong effect on the volume of Mexican ADRs and closed-end funds. However, the same news had little effect on the volume of Non-Mexican ADRs and closed-end funds, whether they are Latin American or Asian. From December 21, 1994, to April 30, 1995, Mexican news explain five percent of the variation in Mexican ADR volume and nine percent in Mexican closed-end funds volume. In contrast, it explains nothing of the variation in Asian ADR or closed-end fund volume. For Latin American ADR and closed-end funds, Mexican news explains 1.1 percent of variation in volume of closed-end funds and 0.3 percent of variation in volume of ADRs. Though it may be that using different measurement intervals would lead to different conclusions, this evidence is more supportive of the view that Mexican events provided useful information to markets rather than of the view of a stampede of uninformed investors harming valuations by their sudden excessive cautiousness.

Another way to consider the economic importance of contagion is provided by Sachs, Tornell and Velasco (1996). They examine the reaction of twenty emerging countries to the Mexican crisis. They argue that countries that suffered significantly from the Tequila effect are countries that were weak to start with, in that they suffered simultaneously from a weak banking sector, an overvalued currency, and low reserves. In such a country, withdrawals of capital by foreign investors adversely affect the currency and endanger the banking

sector as the value of foreign currency denominated liabilities increases in domestic currency. They argue that in the countries that did not suffer from these problems, the “Tequila effect left no hangover” (p. 193). They find, however, no additional explanatory power from the magnitude and composition of capital flows before the crisis. In other words, large net portfolio flows did not make a crisis more likely.

Section 3. Flows and asset returns.

In the first section, we saw that liberalization increases valuations and decreases the cost of capital. In the second section, we saw that there is little evidence of large increases in cross-country comovements with liberalization and that, while comovements are larger in bear markets, it is quite difficult to distinguish contagion effects from information effects based on evidence on stock valuations. In this section, we address the issue of whether changes in valuations can be traced directly to flows. In other words, we try to understand how an additional dollar of flows affects valuations. This issue is at the heart of the concern of whether flows can push up equity prices irrationally only to bring them to a crash when foreign capital withdraws unexpectedly. With this view, flows increase prices when they come in and decrease them when they leave. Further, they make prices more volatile because they come and go at a whim. From reading some commentators, it would seem that there is little debate about this issue. For instance, Dornbusch and Park (1995) argue that “there is ample evidence that financial market opening is likely to increase the volatility of asset prices”(p. 39). The mechanism they have in mind is that foreign investors buy more as prices go up, engaging in what is called positive feedback trading. As they do this, prices keep increasing. Further, they also argue that the interest of foreign investors makes markets more liquid, thereby facilitating speculative trades.

There is a long tradition in financial economics that argues that demand and supply shocks that do not convey information about fundamentals are unimportant. This tradition got its start with Scholes (1968). He shows very carefully that sales of large blocks of stocks have a negligible impact on the stock price when these

trades are made purely for liquidity reasons. The reason is straightforward. If the equity of an individual firm becomes underpriced, investors can make money by buying it. Similarly, if equity is overpriced, those who own that equity can make money by selling it. Trades undertaken purely for liquidity reasons provide no information about the value of the equity for investors and hence do not change investors' assessment of the value of equity. If the investors suspect that a large trade is undertaken because investors have information about the firm, then the large trade will naturally have an impact on the value of equity as buyers will only buy at a price that protects them from the adverse information the seller has. With this view, the demand for securities is perfectly elastic at given prices as long as information about the securities does not change. This view implies that capital inflows or outflows have an impact on valuations only if they are undertaken because of information that foreign investors have that is not yet incorporated in prices.

Are there any reasons to suspect that foreign investors at times are better informed than domestic investors? This seems unlikely. As already mentioned, it is well-known that investors do not take advantage of international diversification as much as simple models would suggest. There are many possible explanations for this phenomenon, but a leading one is that investors are less well-informed about foreign securities than about securities of their own country. They are therefore concerned that when they buy equity from foreign investors, they buy the equity that foreign investors believe to be overvalued. A natural protection for investors who diversify internationally is therefore to invest in firms for which information is more easily available. Typically, large firms are the ones for which most information is available.

Unfortunately, there is little data to test the hypothesis that foreign investors favor large firms. Japan seems to be the only country where the data on holdings of equity by foreign investors is easily available at the firm level. Kang and Stulz (1997) demonstrate that foreign investors have a considerable bias towards large firm stocks in Japan. Dividing Japanese firms each year into five groups according to firm size, they find that foreign ownership in the smallest firms is 1.8 percent on average from 1975 to 1991; in contrast, ownership

in the largest firms is 7.66 percent. This large difference in ownership between small and large firms is not completely attributable to the decrease in the information advantage of local investors as firm size increases. Most international investment is done by institutional investors. As reported by Falkenstein (1996), institutional investors have a preference for shares of large firms. These shares have lower transaction costs, are more liquid, and enable investors to make larger trades without affecting share prices. The overall preference of foreign investors for large firms suggests that one would see large firms having a lower cost of capital. For the case of Japan, Kang and Stulz (1997) show that there is weak evidence that shares in which foreign investment is large have lower average returns.

The Mexican crisis offers another piece of evidence that foreign investors are at an informational disadvantage. Whereas some have blamed foreign investors for Mexico's troubles, careful examination reveals quite a different story. Capital outflows from residents took place throughout 1994 following the assassination of the presidential candidate Colosio on March 23, 1994. In contrast, foreign investors were net buyers of Mexican equity even in December 1994.

Frankel and Schmukler (1996) find an interesting way to look at this issue. They investigate the returns of Mexican closed-end funds that trade in the U.S. A closed-end fund typically trades at a price that differs from the value of the portfolio that it represents. The value of the underlying portfolio is called the Net Asset Value (NAV) of the fund. Frankel and Schmukler (1996) reason that the price of a fund moves because of its U.S. investors whereas the NAV moves because of Mexican investors since the underlying portfolio is a portfolio of Mexican stocks that trade in Mexico city. They find that the NAV moves before the price of the fund and causes changes in the price of the fund. Their interpretation is that Mexico City moves Wall Street's assessment of Mexican stocks rather than the reverse.

If foreign investors are less well-informed than domestic investors, they will be more sensitive than domestic investors to public announcements. First, because public announcements are less likely to be news

for domestic investors because they are insiders. Second, since foreign investors are less well-informed, their assessment of a country is less precise and hence can be altered more by public information. This makes capital flows sensitive to news. Brennan and Cao (1997) model this phenomenon and provide supporting evidence. Note that this sensitivity to news implies a behavior that is not too dissimilar to the one discussed by Dornbusch and Park (1995). If investors react to news strongly, they buy when stock prices are increasing and sell when stock prices are falling. This makes capital flows correlated with contemporaneous returns. However, there seems to be no clear evidence in Brennan and Cao (1997) that investors practice a positive feedback trading strategy in that there is no evidence that high returns are followed by high flows rather than accompanied by high flows. Tesar and Werner (1993) also look at the issue of the determinants of equity portfolio flows. Unfortunately, they only report correlations. Nevertheless, in their dataset there is also evidence of a positive contemporaneous correlation between returns and flows for most Latin American countries and some Asian countries.

If domestic investors are better informed than foreign investors, they hold more domestic shares on average. The reason for this is that foreign investors discount share prices relative to domestic investors since domestic investors tend to sell if they have adverse information that is not incorporated in asset prices. This means that foreign investors do not take as much advantage of international diversification as they would if all investors had the same information. This home bias resulting from information asymmetries implies that the cost of capital in the domestic country is higher than it would be in the absence of these asymmetries because domestic investors bear more risk. As flows leave the country because of bad news, equity prices fall because domestic investors have to hold more domestic shares. Inflows have the opposite effect. This means that in such a model flows have an impact on the cost of capital. It is also the case that information asymmetries between domestic and foreign investors increase equity returns volatility. There is no reason for flows induced by new information to be destabilizing, however. As information is revealed, investors change their holdings, which

has a permanent effect on prices.

When shares are sold from domestic investors to foreign investors, the shares become held by investors who are internationally diversified and who do not view domestic shares to be as risky as domestic investors. Unexpected changes in investor composition affect equity prices for two reasons, one permanent and one transitory. The permanent reason is the one discussed in the previous paragraph, namely that investors requiring a lower risk premium bought the shares. As foreign investors come to the domestic country, however, there might also be a transitory effect, which is that as they seek to buy the securities, they have to offer domestic investors an inducement so that they will sell. This compensation only affects prices in the short-run and its size depends on the liquidity of the markets. In very liquid markets, the compensation is trivial. As markets become less liquid, it might be substantial. This liquidity compensation has to be paid by investors who seek to buy as well as by investors who seek to sell. If an investor wants to get out of a country quickly, she has to offer a discount on the shares she wishes to sell. As shown by Campbell, Grossman and Wang (1993), this liquidity compensation creates reversals in stock prices. When a large group of investors wants to get out of stocks in a market, they have to provide compensation to buyers of their shares in the form of a larger short-term return. Buyers can only obtain this return by buying the shares at a temporarily low price. There is evidence for the U.S. that such an effect exists, but there is also evidence that it becomes much weaker over time as markets become more efficient.¹²

This liquidity compensation is a cost that investors pay to trade and it affects their trading strategies. In the extreme case, an illiquid market has a lock-in effect: the discount to be paid to get out is too high and therefore investors do not sell and ride out the bad times. Illiquidity can also keep investors out, however. Not

¹² Froot and Perold (1995) document that the short-term behavior of stock prices is different in recent years from what it has been historically. Yesterday's stock returns have much less information about tomorrow's stock returns than they used to. Gagnon and Karolyi (1997) show that the volume-returns relation is much weaker after the Crash of 1987 than before.

surprisingly, international investors tend to hold securities for which this liquidity compensation is small, namely securities of large firms. Though some have argued that liquid markets promote short-term horizons on the part of investors which hurt economies, going even so far as arguing that the liquid markets of the U.S. were a source of competitive disadvantage for the U.S. It is important to remember that liquid markets facilitate purchases by investors. Investors who cannot sell in a country have no incentives to invest in that country.

We now look at the evidence of the impact of flows on returns. There is a paucity of empirical evidence at this point. Part of the reason for this is that good data on international flows is hard to find. Before turning to the international evidence, we first consider some evidence for the U.S. that uses high quality data.

There is clear evidence from the U.S. that changes in the composition of investors can have a direct impact on the value of equity. Over the last twenty years, indexing has become tremendously important and the index chosen most often for index portfolios is the S&P 500. Consequently when a stock joins the S&P 500, this immediately creates a demand for that stock from indexers. Standard and Poors adds stocks to the S&P 500 based on public information, so that the fact that a stock is added to the S&P 500 does not reveal information about the true value of the stock. Further, indexers have to buy the stock irrespective of its price on the date that it joins the S&P 500. This means that no information is conveyed by the increased demand for the stock. According to the traditional finance model, there should be no price impact when a stock joins the S&P 500. Yet, there is such a price impact. Shleifer (1986) and Harris and Gurel (1986) estimate this impact at three to four percent. Further, all the evidence suggests that this impact is permanent, corresponding to a decrease in the cost of capital for firms that join the S&P 500. The most sensible explanation for this effect is that the demand for the stock has increased. Existing investors in the stock do not have a perfect substitute for the stock that they are giving up if they sell, so that the total demand for the stock increases.

Adding a stock to the S&P 500 probably does not affect the overall demand for stocks. Rather, the existing demand gets redistributed across stocks and this redistribution has a price effect. One might argue that

such an example understates the importance of changes in demand and that the situation of emerging markets facing an inflow of capital is more akin to what happens when new mutual fund money flows into the U.S. stock market. An inflow of mutual fund money is mostly money that was not invested in the stock market. In an interesting recent study, Warther (1995) argues that the impact of an unexpected flow of mutual fund money in the U.S. stock market is rather considerable. His estimates are that a one percent increase in mutual fund stock assets, which for his sample period corresponds to an inflow in the stock market of \$4.57 billion, brings about an increase in stock prices of 5.7 percent. His concern is naturally whether this is a reversible price impact due to liquidity or a permanent price impact. Though he looks hard to find reversals, he is not successful. It appears that this effect is a permanent effect. A plausible explanation for this is that a broadening of the shareholder base lowers the risk premium as risks are spread across more investors.

Flows move prices. One would expect this to be the case if the risk of stocks becomes spread across more investors. The alternative explanation is that flows move prices because they drive stock prices away from fundamentals. As investors flow into a market, they push prices up without regard for fundamentals, driven by some feeding frenzy. Eventually, prices collapse. Clark and Berko (1996) attempt to distinguish between these two views in the case of Mexico. Mexico saw a dramatic increase in foreign ownership during their sample period. From 1989 to the end of 1993, foreign ownership of Mexican equities increased from a trivial amount to more than one-fourth of the Mexican market capitalization. Like Warther (1995), they find a strong effect of flows on returns. Their estimate is that an unexpected inflow equal to one percent of the capital of the market leads to a contemporaneous increase in prices of 13 percent. This estimate is actually smaller than Warther (1995). They find no evidence of price reversals, suggesting that the impact of flows is permanent rather than transitory and cannot be explained by price pressure. They also find no support for the hypothesis of positive feedback trading. Therefore, their evidence is fully supportive of the investor base broadening hypothesis.

In an article discussing the difficulties of some Asian emerging markets, an economist at J.P. Morgan was quoted in the New York Times as saying: "One wishes the markets were less fickle". It could indeed be that flows have a permanent effect on prices, but that they are so volatile and fickle that, by coming and going, they keep inflicting shocks on prices. This is the concern often expressed about portfolio flows that somehow equity investments are the wrong kind of investments for a country because they can leave a country rapidly. This view seems rather perverse in that, in the absence of contracting costs, there would be little reason to have direct foreign investment and all foreign investment would be portfolio investment. This suggests that portfolio investment is a more advanced and more efficient form of international investment. However, there are many ways to obtain financing through sales of securities. The risk of financing through short-term debt is that one might not like the conditions at which the debt can be refinanced. Portfolio flows should not be blamed when a country or a firm has chosen a financing strategy that leaves it exposed to refinancing risks.

Though well-established, the view that portfolio investment is more fickle than other forms of investment seems to have little empirical basis. In a useful study, Claesens, Dooley and Warner (1993) investigate the volatility of foreign direct investment, portfolio equity flows, long-term flows, and short-term flows for five developed economies and five developing countries. They also break down flows by transactors, namely foreign direct investors, banks, governments and the private sector. The developing countries in their sample are Mexico, the Republic of Korea, Indonesia, Argentina, and Brazil. In all cases, they focus mainly on net flows. Their results are surprising in light of the comments about fickle equity flows. They find no support for the notion that equity flows are somehow less stable than direct investment or official flows. They find that the label of flows provides no information about how they behave over time. Their conclusion is that "if presented with one time-series (statistics) only, one will likely be unable to tell the label of the flow." (p. 26).

Liberalization opens the door to capital flows. These flows impact security prices. Another implication

of the hypothesis that portfolio flows are excessively volatile is that portfolio flows increase the volatility of security returns through their impact on security prices. The risk-sharing hypothesis that predicts a decrease in the cost of capital suggests that opening up a country could well decrease the volatility of its security returns. Consider the example of our closed economy that has a comparative advantage in producing coffee beans. An adverse event that decreases the value of the coffee crop makes the country poorer. Suppose that poorer investors are more reluctant to bear risk. In this case, the adverse shock increases the risk premium and hence decreases the stock prices even further. If this economy is an open economy, the adverse shock will be spread across investors throughout the world and hence will have only a trivial effect on the risk premium. With this analysis, opening up the economy decreases volatility. However, opening up the economy means that the risk premium on the coffee bean industry now depends on worldwide factors, so that shocks to the world risk premium affect the value of the coffee bean industry. If one thinks that risk premia should be fairly stable on world markets, then opening up a country decreases volatility if investors who have become poorer are less willing to bear risk.

Let's consider the empirical evidence on volatility and liberalization. A number of different authors have examined this issue, using different approaches. Kim and Singal (1993) consider changes in volatility around liberalizations for a sample of 16 emerging markets. In their study, they find that the volatility for the first 12 months following a liberalization is not significantly different from the volatility for the previous 12 months. However, they also find that after the first 12 months, volatility falls significantly on average. They provide other evidence that is consistent with an increase in volatility for some countries and no effect for most countries. Interestingly, the countries for which they find large significant increases are Argentina, Chile, and Mexico. Richards (1996) estimates volatility for emerging markets using weekly data and concludes that "the period 1992-1995, which saw foreign institutional investors playing a more significant role in emerging markets has been characterized by volatility that is marginally lower than the remainder of the sample period (1975 to

1992).” (p. 473). His result is surprising in that it covers the period of the Mexican crisis. Bekaert and Harvey (1997b) consider 20 emerging markets and examine stock return volatility before and after liberalization. Using a variety of approaches, they find in all cases that on average liberalization decreases volatility. The bottom line from these studies is that the claim that liberalization increases volatility is not supported by empirical evidence.

These volatility studies do not relate flows directly to volatility. Hamao and Mei (1996) do this for the case of Japan using monthly data on equity purchases and sales by foreign investors. Foreign portfolio equity investment in Japan is small over the last twenty years, peaking in 1984 at 10.31 percent but falling back to less than five percent in 1990. This means that evidence for Japan has to be viewed with caution on this issue. Nevertheless, they find that the trades by foreign investors do not differ in impact on volatility from the trades by other investors.

Folkerts-Landau and Ito (1995) provide some data where they compute volatility of emerging markets for periods that differ in the intensity of portfolio flows. Table 5 summarizes their evidence. They also show evidence on the issue of whether a day of high volatility for the Dow Jones predicts a high volatility the next day on an emerging market for periods where the nature of flows differ. Overall, their evidence is rather mixed. Mexican stock prices appear to be the least volatile when flows are most volatile. In contrast, however, Hong Kong stock return volatility is higher when flows are most volatile. There seems to be evidence that the local volatility is more strongly linked to the volatility of the Dow Jones in periods of more volatile flows.

Models where foreign investors are less well-informed than local investors and alter their holdings when they receive new information produce a positive relation between stock return volatility and flow volatility. However, in this case, this relation results mostly from flows and stock prices being driven by the same factors. The relation between flows and volatility would be a source of concern if it was due to temporary increases and decreases in stock prices. Such a concern is often expressed as a concern about herding by

Table 5. Flows and volatility of stock returns.

This table is constructed from tables I.13 and I.14 in Folkert-Landau and Ito (1995).

Country	Volatility of daily returns	Local volatility divided by volatility of Dow-Jones	Correlation between local squared return and previous day Dow-Jones squared return
Hong Kong			
Low-inflow period (Jan. 1988-Aug. 1991)	1.61	1.52	0.068
High-inflow period (Sept. 1991-Oct. 1993)	1.31	1.98	0.023
Volatile-flow period (Nov. 1993-July 1994)	2.33	3.68	0.150
Korea			
Low-inflow period (Jan. 1988-Dec. 1991)	1.51	1.42	0.055
High-inflow period (Jan. 1992-June 1993)	1.18	2.55	0.029
Volatile-flow period (July 1993-July 1994)	1.14	2.31	0.120
Thailand			
Volatile-inflow period (Jan. 1988-Apr. 1991)	1.19	1.74	0.296
Moderate-inflow period (May 1991-Oct. 1992)	1.69	2.14	0.115
High-flow period (July 1993-July 1994)	1.17	2.66	0.103
Mexico			
Low-inflow period (Jan. 1988-Apr. 1990)	1.99	1.88	0.048
Volatile-flow period (May 1990-Jan. 1993)	1.57	1.76	0.324
More-stead inflow period (Feb. 1993-July 1994)	1.61	2.57	0.003

institutional investors. The idea is that institutional investors behave alike, pouring in and out of stocks as a group. In the most detailed and careful study to date, Wermers (1998) studies whether U.S. institutional investors herd and whether this behavior leads to temporary changes in stock prices. He finds strong evidence of herding behavior, especially for smaller stocks. However, at the same time, he fails to find evidence that herding leads to temporary changes in stock prices. An increase in institutional ownership is associated with an increase in stock prices, but this increase appears to be permanent.

5. Conclusions.

The empirical evidence shows that international portfolio flows have a beneficial effect on countries that liberalize by decreasing the cost of capital in these countries and enabling residents to share risks with other investors. Portfolio inflows seem to have permanent positive effects on valuations. There is no empirical evidence that provides strong support for the view that portfolio flows increase volatility of security returns and otherwise adversely affect the performance of equity markets. In particular, there is little evidence that the opening up of countries has led to substantial increases in the comovement of their stock markets with the world market. There is evidence that investors find information about one emerging market to be useful in their assessment of other emerging markets. However, proponents of the view that there is extensive irrational contagion across emerging markets have yet to prove their case.

Opening a country to portfolio flows makes the country better off by enabling it to share risks with foreigners and to have a lower cost of capital for its industries. It positions the country to receive more capital when the country's investment opportunities improve. The only way that a country can take advantage of these benefits is by understanding fully that in a market economy, foreign investors pursue the best investment opportunities available as they see them. They have strong incentives to identify all good investment

opportunities carefully, because any opportunity they miss lowers the return on their portfolio. Their behavior makes investors as unlikely to be swept away by irrational contagion as to stay passive when governments try to maintain exchange rates and interest rates that are not sustainable.

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