Chapter Title: Introduction to "The Internationalization of Equity Markets "

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Introduction

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The internationalization of equity markets encompasses the intersection of three important trends. The first trend is relevant even to the United States, where, as in the United Kingdom, equity markets have long been a dominant part of the financial system. Here the trend is increasing *integration* with the rest of the world, as American investors look abroad, foreign investors buy U.S. equities, and prices on the New York Stock Exchange become increasingly linked with those in London, Tokyo, and around the world. By 1993, for example, American holdings of foreign stocks had reached $210 billion, more than double the level of 1990.

The second trend is particularly relevant to countries such as Japan, Germany, and France, where equity markets have not in the past been as developed or active. It is *securitization*, defined as increased reliance of the financial system on markets in equities and bonds at the expense of banks and other financial intermediaries. In 1989, the capitalization of the stock market in Japan, for example, surpassed that of the U.S. market.[1] World stock market capitalization for developed countries exceeded $10 trillion in 1991, quadruple the nominal level of ten years earlier.

The third trend is particularly relevant to newly industrializing countries, though it, like the first two trends, can also be identified with other sorts of countries. It is the *opening* of national financial systems to international finan-

1. The crossover appears to have occurred earlier, if one does not adjust the Japanese stock market for cross-holdings. Using either basis of comparison, the U.S. market regained the lead soon thereafter.

cial flows and institutions, as governments remove capital controls and other barriers. Foreign holdings of equities in emerging markets have been estimated to have risen as high as $160 billion by the end of 1993, compared to only $2 billion seven years earlier. Part of this phenomenal rate of growth is attributable to large increases in market prices. New purchases of equities from developing countries are still smaller than the volume of gross flows among industrialized countries. They are bound, however, to play an increasingly important role in the financial development of the recipient countries.[2]

An increasingly integrated, securitized, and open world financial system suggests important questions, and offers a rich set of data with which to attempt to answer them. Some of these questions are new ones raised by the international environment itself. What are the gains to international diversification, for example, from the viewpoint of a U.S. investor? To what extent are markets in fact now integrated across countries? Do investors still exhibit an unexplained home-country bias, despite the degree of globalization that has taken place? What is the role of the specific times and locations around the world at which stocks are traded?

Other questions are versions of questions of longstanding interest in the context of domestic equity markets. Are the markets efficient? Are expected returns determined in world markets by variances, covariances, and the price of risk as suggested by the capital asset pricing model (CAPM)? If not, what is the correct alternative model? To answer these questions we will also have to ask, What is the appropriate international version of the CAPM, or of other models of asset pricing that have been developed in the domestic context?

Most less-developed countries have previously been "financially repressed" and partially closed off from world financial markets. What are the effects when such countries liberalize and open up to foreign investors? Do the theoretical gains from trade across time and across states of nature in fact show up in the data? How can one disentangle the extent to which fundamental shocks in such economies are independent of those in industrialized economies (offering a valuable opportunity for diversification) and the extent to which barriers continue to segment the markets? Have country funds offered an effective first wedge into markets where barriers still prevent foreign investors from entering freely?

These are some of the questions this volume seeks to address. Many of them have until recently been underexplored, sufficiently so that it is possible to make relatively tangible progress.

2. Claessens and Rhee (chap. 5 in this volume) give some figures for 1989–1992. A third of the flow over the four-year period took place via country funds.

Part I: Asset Pricing and Home-Country Bias in Internationally Integrated Markets

Limitations of the Existing Literature

Models of equity pricing have been the centerpiece of the finance field over the last twenty-five years. The literature has continued to develop rapidly in a technical sense. Such innovations as allowing variation over time in first and second moments of returns (that is, in expected rates of return, variances, and covariances) are very important if one hopes to be able to capture a world of changing realities. In other respects, however, the research has not entirely kept pace with some of the major phenomena in world markets that need to be addressed.

Two shortcomings of standard tests of asset-pricing models have been known for a long time, but have become even more important as equity markets have become internationalized. More than fifteen years ago, Richard Roll (1977) emphasized the importance in tests of the CAPM of using as comprehensive a set of assets as possible. Today, a majority of tests conducted by American researchers leave out other countries' assets entirely. Other tests conducted by international financial economists often commit the symmetric sin of concentrating on a sample of countries' bonds, either omitting equities entirely or else simply adding a single equity index such as the Standard and Poor's 500 to the list of assets. Both approaches blithely omit categories of assets that are some of the most important in world markets.

A second shortcoming of the standard tests is that they usually measure all returns in terms of dollars. The implicit assumption is that any asset whose return is fixed in terms of dollars, such as U.S. deposits, is completely safe, and that the risk of other assets can be measured by their correlation with the market basket return expressed in dollars. If U.S. investors were the only ones whose behavior mattered, this assumption would not be too bad at short horizons. Because monthly variability in the U.S. consumer price index is so low— compared to the variability in the prices of stocks, bonds, and foreign exchange—the real value of dollar deposits is almost certain at a horizon of one month or less, from the viewpoint of American investors.

U.S. investors, however, are not the only ones in the market, either the market for U.S. stocks or the market for foreign stocks. Just as American investors find dollar assets less risky than deutsche mark or yen assets, so do Japanese investors find yen assets less risky and German residents find mark assets less risky. If major stock markets are integrated, then the behavior of each nationality of investors who participate in this integrated global market is relevant. More precisely, in market equilibrium, each investor nationality should be weighted by the size of its total portfolio. The weight has been shifting away from U.S. investors. Because U.S. assets abroad are now exceeded by foreigners' assets in the United States, it would be more correct to oversimplify by

assuming that the representative global investor in world markets is a foreign resident, than to continue with the old oversimplification of assuming that the representative investor is an American. There is no need, however, for either sort of oversimplification.

If purchasing power parity (PPP) held among currencies, the proper test would be a simple matter of identifying the price index of the appropriate international basket of goods consumed by investors, and measuring asset returns in terms of it.[3] PPP does not hold in the short run, however, not even approximately. Thus, using a single composite international price index is not much better than using a dollar price index. There is little way around letting investors of different countries behave differently. We will use the phrase "preferred local habitat" to refer to the implication that follows from this failure of PPP: the proposition that investors who live in different countries will use different reference currencies to evaluate what is a safe asset and what is a risky asset.

More than fifteen years after these points were first emphasized,[4] very few modern tests of international asset pricing seriously address them. This refusal by most researchers to allow investors to live in whatever country they choose seems rather intolerant.

Other kinds of heterogeneity of investors across countries are possible as well. One can allow investors to have different degrees of risk aversion, as in Charles Engel's contribution to this volume (chap. 3), or to have different expectations regarding stock market performance, as in French and Poterba (1991). These extensions are probably of a lower priority, however, than allowing for differences in the consumption basket.

International Factors and Rates of Return

The state-of-the-art work of Campbell Harvey (1989, 1991, 1993), alone and together with Wayne Ferson (1993, 1994), addresses some serious shortcomings of the previous literature. It allows expected returns to vary over time by conditioning them on a set of observable instrumental variables, such as dividend yields. It also allows variances to vary over time, for example, by means of the famous ARCH process introduced by Robert Engle and developed in subsequent elaborations, such as Bollerslev, Engle, and Wooldridge (1988). In the technique of Harvey (1991), variances and covariances are also allowed to vary in a general way (somewhat analogously to the way first moments are allowed to vary in a completely unrestricted way in the method used by Charles Engel).

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3. A classic reference that follows this approach is Grauer, Litzenberger, and Stehle (1976).

4. Solnik (1977) first modeled investors in each country as caring only about returns expressed in their own country's terms, because they consume no foreign goods, and domestic goods prices are nonstochastic. The more general framework in which investors have a home-country bias based on consumption patterns (the "preferred local habitat" model) was developed by Kouri and de Macedo (1978), Dornbusch (1983), and Frankel (1982) in the economics literature, and Stulz (1981a) and Adler and Dumas (1983), a classic survey, in the finance literature.

Many researchers have sought refuge from the mundane realities of CAPM tests—such as the aforementioned difficulty of measuring all assets—by assuming a world of representative agents, each of whom maximizes an (identical) intertemporal expected utility function. The solution is more apparent than real, however, as the theoretical constructs in such models are often even more difficult to measure empirically. Moreover, a representative agent model is clearly inappropriate for addressing our second concern, explained above, heterogeneity of investors across countries. Dumas (1993) has considered the prospects for reconciling this model, which he calls the "orthodox general equilibrium approach," with some of the stylized facts of international finance that concern us in this volume: PPP deviations, home bias in equity preferences, and differences in expected returns across countries. He concludes that the CAPM, which he calls the "heterodox partial-equilibrium approach," is more likely to accommodate these stylized facts.

In recent work, Dumas and Solnik (1993) use instrumental variables similar to Harvey's to condition expected returns, but at the same time seek to move beyond the assumption that all investors live in the United States, to address the issue of preferred local habitats. Their technique for choosing between the international and classical versions of the CAPM allows the data to suggest whether the return on a country's equities is determined by putting weight on correlations with individual currencies, or solely by the correlation with the aggregate market portfolio. In chapter 1 of this volume, Bernard Dumas extends this approach in the direction of addressing what I will call the Summers ketchup critique.

Larry Summers (1985) registered a complaint with research in finance: that it spends all its energies testing, essentially, whether the price of one-quart ketchup bottles bears the hypothesized relationship to the price of one-pint ketchup bottles. Summers was referring to the habit of testing the relationship between the first moment of stock returns and the second moment of stock returns, with no other data beyond stock prices entering the analysis. (One might add that the practice of using lagged stock returns as instrumental variables does little to reduce the circularity.) In a study of the ketchup market, one would hope to explain the price of ketchup in terms of such factors as wages, the price of tomatoes, the income of consumers, the price of hamburgers, the price of mustard, and so on. Similarly, argues Summers, one would hope to be able to explain stock returns in terms of fundamental economic variables.

The Dumas study appearing here dispenses with the variables internal to the financial markets, such as dividend/price ratios, that others have relied on to predict returns. Instead, indicators of real economic activity are used as instrumental variables: for example, housing-start authorizations, increases in manufacturing inventories, the percentage of companies reporting slower deliveries, and other variables found by Stock and Watson (1992) to be important in predicting real activity. Viewed in the light of the Summers ketchup critique of

the circularity of the standard approach, the Dumas study is a commendable attempt to relate international equity returns to real economic variables. This line of inquiry is useful even if the real economic variables do not predict returns as well as the financial variables do, although one is reassured to see that these instruments have at least some statistical power. Dumas then tests the international conditional CAPM against the classic conditional CAPM and statistically does not reject the former. He also tests the classic conditional CAPM (against an unspecified alternative), and *does* reject it; so the reader's prior beliefs regarding the CAPM will affect the way he or she wishes to interpret the findings.

Chapter 2 in this volume consists of Wayne Ferson and Campbell Harvey's latest contribution to tests of international asset pricing. They seek to bridge the gap between state-of-the-art finance and practitioners who engage in "asset allocation" based on whatever observable variables seem to be useful for picking stocks.

Like Adler and Dumas (1983) and Dumas and Solnik (1993), they assume that returns on individual assets will be related not only to the return on a world market portfolio (the Morgan Stanley Capital International index),[5] but also to the return on holding a portfolio of G10 currencies. Ferson and Harvey interpret the two coefficients as betas, one on the world stock market portfolio and one on the currency portfolio, and let them vary over time as functions of certain attributes of the national equity markets. The idea is that attributes of the national markets should predict the cross section of future returns only to the extent that differences in the attributes across countries measure differences in the betas. Ferson and Harvey model the betas as functions of three groups of attributes: (*a*) valuation ratios, such as price-to-book value and price-to-cash-flow, (*b*) industrial structure, and (*c*) economic performance measures, such as relative gross national product (GNP) growth and relative inflation.

They test whether these betas are statistically related to expected returns on the assets in question, against a number of ad hoc alternative hypotheses. They do not, however, focus explicitly on second moments to test whether a higher level of risk on an asset requires a higher expected return to induce investors to willingly hold that asset—as in classic tests of the CAPM. The proposition that predictable components of returns must be risk premia is assumed rather than tested.[6] This approach has become the norm in models of risk.[7] As Bruce Lehmann notes, yesterday's "anomalies" of predictability have become today's risk premiums. (Possible alternative interpretations of predictability are considered below, in part II.)

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5. They cite Stulz (1984) for the conditions under which a single-beta CAPM based on a world market portfolio holds.

6. Harvey (1989) tests the proposition.

7. Many researchers follow the strategy of, first, developing a complete intertemporal optimization theory, and then—when it comes time to test, and the empirical counterparts of the theoretical "state variables" are nowhere to be found—adopting convenient observable variables as proxies.

There is always a concern that a test of the CAPM is not meaningful because one cannot actually measure the correct benchmark portfolio. The concern has given rise to a tradition of adding in whatever additional factors the researcher thinks might be useful in explaining returns. Ferson and Harvey (1993, 1994) have found oil prices, industrial-country industrial production, and industrial-country inflation rates useful in past work, but do not get very far with them here. The coefficients in cross-sectional regressions of returns on lagged attributes, which should be the factor premia if the attributes measure betas, are only weakly related to premiums for these global risk factors. Ferson and Harvey's tests do suggest that the attributes may be useful for modeling the world equity market and the currency portfolio. Findings that returns on some countries' stocks are related to observable economic factors will always be of interest to practitioners.

Tests of the International CAPM and Home-Country Bias

The contribution to this volume by Engel (and that by Linda Tesar and Ingrid Werner [chap. 4]) tests the international CAPM with a technique that addresses many of the limitations of the existing literature.[8] Like the state-of-the-art finance tests, Engel's test in chapter 3 allows conditional expected returns to vary over time. Unlike these tests, however, the CASE method (Constrained Asset Share Estimation) does not require that the information set upon which investors condition their expectations be limited to a handful of variables observed by the econometrician. Rather, investors' expectations, regardless of what they are based on, can be inferred from their observed asset holdings. Asset stock measures do not have to be introduced extraneously; they are already implicitly present in the standard CAPM measure of the return on the overall market portfolio that everyone uses, as the weights that are used to aggregate individual assets' returns.

The downside of the technique, as Engel admits, is that the second moments must be modeled in an ad hoc way reminiscent of how other studies model the first moments. Variances and covariances must be assumed either to follow some sort of ARCH or GARCH process or to be related to lagged values of observable economic variables, if they are not assumed constant altogether.[9] Of course the same is true of other tests.

8. Some of these attractions were also claimed by the tests in Frankel (1982, 1983, and 1985) and Frankel and Engel (1984). But the technique has in the past included only a limited set of assets—thus being subject to the Roll critique. Furthermore, the four papers cited also required that the variances and covariances be constant over time.

9. The GARCH version of the CASE method has also been tested by Engel and Rodrigues (1989), and Engel, Frankel, Froot, and Rodrigues (1994). The application of the technique by Giovannini and Jorion (1989) added the U.S. stock market to the set of international bonds considered in the earlier papers, and conditioned variances on the level of interest rates. Like the earlier papers, it rejected the CAPM hypothesis. Engel and Rodrigues (1993) included a range of countries' stock markets, and conditioned variances on a set of economic variables like some of the instrumental variables used in the Dumas (chap. 1) and Ferson-Harvey (chap. 2) contributions to the present volume.

A second advantage of the CASE method is that the null hypothesis of the international conditional CAPM is tested against interesting explicit alternative hypotheses. Most notably, it affords a natural test of the CAPM against the Tobin model in which investors balance their portfolios across assets as general functions of expected returns, without necessarily diversifying optimally. One must conclude that this particular alternative hypothesis is of more interest to economists than to finance specialists, however, given the gulf that appears between the two strands in the literature. Other alternative hypotheses that one could imagine, and that are considered by other contributors to this volume, include market segmentation, noise trading, and the possibility that ex ante returns cannot in finite samples reliably be inferred from ex post realizations. Tests are always more interesting with an alternative hypothesis.

A third important advantage is that Engel allows his investors to live in whatever country they choose, like Dumas and Solnik (1993) but unlike most tests. In other words, residents of each country are allowed to have their own asset preferences, and their asset demands are then added up to arrive at the overall market equilibrium. This trick is accomplished by using cumulated data on countries' current account positions, measuring their net investment positions vis-à-vis each other. For example, Japan's wealth increases at the expense of America's when the former runs a current account surplus and the latter a current account deficit.

One of the nested hypotheses tested by Engel, his Model 3, seeks to dispense with the data on national wealths by assuming them constant and allowing their levels to be estimated endogenously. His Model 3 is in fact somewhat like the famous equation (14) of Adler and Dumas (1983), as tested, for example, by Dumas and Solnik (1993) or reproduced here as equation (1) in Dumas's paper. (The main difference is that Dumas estimates betas in the traditional first step of a two-step method, while Engel imposes the CASE constraint in a single estimation procedure. This is a constraint of proportionality between the coefficients in the expected return equation, on the one hand, and the variance-covariance matrix of the error term in the same equation, on the other hand.) Engel finds that his Model 3 performs the worst of all the models he tests. Evidently it is necessary to allow for the fact that countries' shares of world wealth do in fact change over time.

Engel's results offer some relatively clear verdicts on some hypotheses that have been widely pondered. First, he does not reject the hypothesis that the coefficient of risk aversion is equal across countries (Model 2 in section 3.4 of chap. 3). The estimated coefficient of relative risk aversion is approximately 4.0. Second, the special case of ARCH is rejected against the more general GARCH.

Especially noteworthy are the verdicts on some of the hypotheses that are central to the goals of this volume. There is weak evidence (that is, at approximately the 10 percent significance level; see section 3.5 of chap. 3) that the

international CAPM has some ability to predict expected returns.[10] Investor heterogeneity appears to be key to the relative success of several versions of the model.[11] Ultimately, however, Engel again rejects the CAPM, because the heterogeneity observed in the data is not quite of the right sort.

Previous results have sounded negative for the international CAPM, but they have been on less firm ground than Engel's. A failure to reject the hypothesis that expected returns are equalized internationally, within the CAPM framework, sounds like bad news for the model; but a failure to reject does not allow one to claim a positive finding. A rejection of CAPM against the more general Tobin alternative also sounds like bad news, but again is somewhat less compelling if the Tobin alternative itself has no explanatory power for expected returns. By paying due attention to a full international array of assets and countries of residence, Engel has been able to reject the constraints of the international CAPM *in favor of a more general alternative that has a particular claim on our interest.* That alternative, the portfolio balance model with an allowance for preferred local habitats, has a particular claim on our interest because it seems to be the only model that has predictive power for asset returns *empirically,* and at the same time follows from a widely used *theory.*[12]

Tesar and Werner in chapter 4 have a more direct way of addressing the failure of the standard tests of the CAPM to allow diversity of investor residence. They work with data on purchases of assets from the balance of payments capital accounts of major countries. Previous researchers have virtually ignored these data. Large measurement errors in the balance of payments data are part of the explanation. Nevertheless there is much to be learned from the data, even with its imperfections, and the authors are to be commended for undertaking this line of research. A good example of the issues that are difficult to analyze without the balance of payments data is precisely the hypothesis of optimal diversification by investors of differing nationalities.

After exploring various patterns in the data, Tesar and Werner use the same technique as Engel to test the CAPM. Instead of aggregating across investors

10. A great many researchers have found an ability to predict expected return differentials using ad hoc predictors. *Within the constraints of the CAPM,* however, previous tests such as Frankel (1982) and Giovannini and Jorion (1989) have been unable to reject the hypothesis that expected returns are equalized across countries. Engel suggests that this may be due to the failure to consider a full set of bonds and equities, or to allow the variances to vary.

11. Thomas and Wickens (1993) apply the CASE method to a portfolio of four countries' bonds and equities. They obtain a rejection of the CAPM, like the earlier studes cited in notes 6 and 7 and other applications of the technique. Their study has all the advantages of Engel's—a reasonably complete international set of assets, time-varying variances, conditional expected returns that can vary freely, an explicit test of the CAPM against an alternative hypothesis—except that it is missing investor heterogeneity.

12. Once again, the portfolio-balance theory has traditionally been of greater interest to economists than to finance specialists. Branson and Henderson (1985) is one survey of the portfolio balance model, with emphasis on the finance perspective. A recent example is Brainard and Tobin (1992).

in different countries of residence, however, they make use of their balance of payments data to examine the behavior of individual nationalities. In the last section of this paper, they concentrate on the asset demands of U.S. investors, due to greater data availability than for other countries. Their test is necessarily only a test of mean-variance efficiency of the portfolios held by American residents, rather than a test of the interntional CAPM hypothesis; but since the latter hypothesis amounts to the proposition that all important investors in the marketplace hold portfolios characterized by mean-variance efficiency, a test of Americans' behavior is certainly a useful piece of information. Like Engel, they are able to reject conditional mean-variance efficiency, against the more general Tobin alternative.

A major motivation for the volume, and especially for Tesar and Werner, is a puzzle that also seems likely to be connected with the statistical rejection of the international CAPM. Investors who reside in different countries are thought to exhibit a bias toward holding home assets. French and Poterba (1991), Golub (1991), and Tesar and Werner (1992) find that there is such a bias in portfolios actually held, notwithstanding the widely noted progress already made in recent years toward the globalization of equity markets. (The data used by Tesar and Werner [1992] for this purpose are the same sort that they use in their contribution to the present volume.) In 1989, U.S. investors reportedly held 94 percent of their stock-market wealth in domestic stocks, Japanese investors held 98 percent, and U.K. investors held 82 percent. In 1990, pension funds in G-7 countries continued to hold more than 90 percent of their assets domestically.[13] Why does not each hold more of the others' equities?[14]

One can readily explain a substantial home-country bias in investors' holdings of short-term bonds, as opposed to equities. The explanation is rational preferences for local currency habitats. Assume a simple model of investors' portfolio allocations based on one-period mean-variance optimization (which is the CAPM). Assume further that goods prices are predetermined in the currency of the country where the good is produced, over a horizon as long as the maturity of the bond. Calculating the optimal portfolio for a given investor, even approximately, is difficult because of sensitivity to expected rates of return, which are difficult to measure precisely. Calculating the *difference* between optimal portfolios held by domestic and foreign residents is much easier, however, assuming that both share the same expectations (and, for simplicity, the same coefficient of risk aversion, as in Engel's results). The reason is that the expectations component of the optimal portfolio share drops out of the difference.

13. Jorion, comment on chapter 4 in this volume.
14. Recent surveys by Dumas (1993) and Obstfeld (1994) each devote sections to this observed bias and its possible explanations.

Let x_A be the share of their portfolio that Americans allocate to U.S. assets and x_G the share of their portfolios that Germans allocate to U.S. assets. Then it can be shown that

$$x_A - x_G = [a_A - a_G]/[1 - 1/\rho],$$

where a_A and a_G are the shares of their consumption that optimally diversified American and German residents, respectively, allocate to U.S. goods, and ρ is the coefficient of relative risk aversion.[15] Intuitively, to the extent that investors are relatively risk-averse ($\rho > 1$), they differ in their portfolio preferences in simple proportion to how they differ in their consumption preferences. The term representing the home-country bias in consumption, $a_A - a_G$, is certainly large in practice. Assume for simplicity that it takes its maximum value of $1 - 0 = 1$. Let us try a value for the coefficient of risk aversion that emerges from Engel's estimates: 4. It follows that the measure of home country bias is relatively large: $x_A - x_G = .75$. If residents of each country in fact hold a mere 10 or 15 percent of their portfolios in foreign bonds, that is fully consistent with optimal diversification ($.85 - .15 = .70 < .75$)! At first glance, home-country bias poses no puzzle.

The puzzle arises in a portfolio that includes equities. To a first approximation, the return on equities is determined as a random draw in the currency of the home country. In other words, in practice this return has a surprisingly low correlation with the exchange rate. There is a substantial correlation of equity returns across countries; Wen-Ling Lui and Takatoshi Ito's contribution to this volume (chap. 7) constitutes the latest piece of evidence on how stock market movements are transmitted from one country to another. The correlation is far from 1, however, which is of course the reason why international equity investment offers a valuable opportunity to diversify.

The key point is that exchange-rate risk is not an impediment to holding foreign equities in the way that it is an impediment to holding foreign bonds. Once investors have given vent to the home-country bias that optimally follows from differences in consumption patterns, in the form of bond portfolios that are relatively undiversified, there is little reason for their equity portfolios to exhibit the same home-country bias. Rather, in theory, American investors should take advantage of the opportunity to diversify by holding approximately the same amount of German equities as German residents hold. They can easily eliminate the gratuitous exchange risk by reducing their holdings of German bonds correspondingly or, equivalently, by selling marks on the forward market. (The prescription to hold foreign equities but hedge the exchange risk has been recommended to portfolio managers as a "free lunch."[16])

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15. One of many possible examples is Frankel (1983), equations (1) and (3).

16. Perold and Schulman (1988). This prescription, and many of the other conclusions that follow from the one-period mean-variance model, change if investors are obliged to take into consideration longer horizons. See Froot (1993).

Clearly, investors' equity portfolios are in fact less diversified than this. In a framework that allows investors of each country to diversify among countries' stocks and bonds as they will, rejection of the CAPM constraint might be attributed to its implication that investors should exhibit home-country bias only in their bonds, not in their stocks.[17] Tesar and Werner, certainly, infer that there is a significant home-country bias puzzle—which cannot be explained by transactions costs—from their evidence that investors trade a lot on the small fraction of the portfolio that they dedicate to foreign assets. They find that gross transactions volumes are very large compared to the magnitude of the corresponding net transactions volume.

Part II: Emerging Markets, Trading Volume, Location, Taxes, Controls, and Other Imperfections

We have seen that the tests, even those that make full allowance for the range of international assets to be held and the range of countries where investors live, seem consistently to reject the international CAPM hypothesis. Why? One possibility is that investors are sophisticated and markets are efficient, but the CAPM does not hold because the assumptions upon which the simple one-period mean-variance framework depends are not justified. The alternative possibility is that international equity markets fall short, in one way or another, of the ideal of a perfectly integrated efficient market where rationally expected returns correctly price risk and investors are able to optimize fully. There are (at least) three ways that markets could fall short of the ideal, all involving an extra degree of heterogeneity arising from such factors as imperfect information. Investor heterogeneity must always be with us; otherwise it would be difficult to explain the high volume of transactions in the equities markets. But it arises more forcefully in a global context than in the domestic context. I have in mind an extra degree of heterogeneity beyond the mere fact of different national consumption baskets considered above.

First, integration may still be far from perfect, due to remaining taxes, regulations, legal differences, and imperfect transmittal of information across countries, segmenting some countries' markets from the world market. Such barriers may be the explanation for observed home-country bias. Second, because markets are not perfectly liquid, there may be a relevant dichotomy between "liquidity traders" and "informed traders." Third, in a world of imperfect information, some investors may make worse use of the available information than others. So-called noise traders may undergo waves of optimism or pessi-

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17. Engel tests the version of the international CAPM that does not allow any home-country bias in equities whatsoever, which is a particularly extreme version of the model, the Solnik form, in which investors are assumed to consider the home currency completely safe, because they are assumed to consume no foreign goods whatsoever. There is room for generalization of the test here to allow for some uncertainty in the investor's home-currency consumer price index, but a different result seems unlikely.

mism regarding investments in particular countries. Each of these three possibilities would be a departure from the Efficient Markets Hypothesis. They each play a role in the second half of the volume.

Segmentation and Emerging Markets

Imperfect integration, as a deviation from the Efficient Markets Hypothesis, is a possibility even in the case of industrialized countries.[18] Japan, for example, had heavy restrictions on foreign stock ownership as recently as 1979, and legal and information differences may still be disinducements to cross-border investment.

Imperfect integration is most evident, however, in the case of less-developed countries (LDCs). Many LDCs have undergone financial liberalization in recent years, spurring a boom in emerging markets. As these countries remove explicit barriers to cross-border investment, they incidentally provide us with convenient experimental data on which to try out tests of segmentation versus integration. This underexplored area promises much exciting research.[19]

Studies of the extent of segmentation have been challenged by the difficulty of disentangling the implications of barriers to integration from the implications of independent economic shocks across countries. While the extent of independence of shocks provides an important *incentive* for cross-border investments and the extent of barriers provides an important *obstacle,* both can show up empirically in the same way: as a relatively low correlation between emerging markets and markets in industrialized countries. One approach is to divide countries into subsamples, according to whether their markets are known to be open at a particular time. Usually, however, liberalization is more of a gradual continuous process, rather than a one-time complete event.

Stijn Claessens and Moon-Whoan Rhee, in chapter 5, study the process of opening by less-developed countries by making use of some interesting new indexes on the degree of foreign "investability" computed by the International Finance Corporation (IFC). They build on a standard test of segmentation in which returns on a countries' equities could either obey the CAPM vis-à-vis the world market portfolio (if the markets are integrated) or vis-à-vis the domestic portfolio alone (if markets are segmented). They reject the hypothesis of complete integration for ten out of sixteen countries. For most of the countries they are not able to reject the opposite polar case of complete segmentation. On the other hand, their results are favorable to integration for more countries than has been the case in past studies on pre-1988 data sets, suggesting that the degree of integration has increased over time.

They then test an equation in which individual returns are determined by the world market beta plus the extra local portfolio beta *interacted* with the IFC

18. Stulz (1981b) and Errunza and Losq (1985) are examples of the theory and testing, respectively, of segmented equity markets.
19. Many of the authors working on this subject have recently been brought together by Claessens and Gooptu (1993).

investability index (which runs on a scale from 0 to 1). This seems like a test well specified to distinguish the effects of segmentation from the inherent correlation of countres' economic disturbances. Yet the results are poor. Only when they look for an effect of the investability index on the *level* of price/earnings ratios, as opposed to the *rate of return,* do they find statistically significant effects: the higher a country's degree of investability, the greater the effective demand for its stocks and the higher their prices.

Claessens and Rhee suspect that the source of their difficulty in finding meaningful effects on rates of return is that ex post price changes are a very noisy indicator of ex ante expectations. Specifically, if a country starts off with some degree of segmentation, and then liberalizes during the sample period, its equity prices should rise at the same time. Investors in this country will have experienced capital gains during the sample period, as compared to another country that retains a high level of capital controls throughout. The first country shows a higher return during the sample, even though the ex ante required rate of return should in theory be higher in the second country. The lesson is that small-sample statistical tests that are implicitly based on an assumption of stationary structure are likely to go awry if used to study a period of structural change. This is an example of a failure of the rational expectations methodology, as distinct from the hypothesis of rational expectations or efficient markets *per se,* that plagues much empirical work throughout the finance field.

The Location and Volume of Trading

Usually in the study of equity markets, we abstract from issues regarding the volume of trading and the location of the trading. It is interesting to reflect, however, that the volume of the day's equity transactions in London, New York, or Tokyo is the economic statistic that the audience of the CNN network and other information outlets apparently finds one of the most important. (Most reported is the day's change in the stock market price index.)

What determines whether a given trade takes place in one financial center or another? The location of the financial industry is not deeply rooted in fundamentals of comparative advantage. In chapter 6, John Campbell and Kenneth Froot study the role of taxes on securities transactions. They examine two kinds of taxes: one in effect in Sweden, which is essentially a tax on domestic brokerage services, and another in effect in the United Kingdom, which is a tax on the legal transfer of ownership of U.K. equities. They find that both kinds of taxes lead to significant responses in the form of a fall in domestic trading. The response can involve either a shift of the same transactions offshore (though this is not an option in the U.K. case), a substitution into other similar (but untaxed) assets, or a decline in trading altogether.

Such research naturally has important implications for the securities industry itself, and potentially for public policy as well. The motivation of countries with securities transactions taxes is usually simply to raise revenue. The Swedish tax might be judged successful if its goal were to reduce the "excessive

income" of securities traders. The U.K. tax might be judged successful if its goal were to reduce the volume of trading in particular U.K. assets, for example, under the theory that "excessive trading" leads to "excessive volatility." Campbell and Froot conclude, however, that proposals to tax securities transactions as a source of tax revenue are less likely to be successful, unless perhaps the taxes can be imposed worldwide so as to prevent traders from shifting offshore.

The transactions tax experiment shows that relatively large shifts in the location of trading can result from relatively small changes in the cost of trading. (Similar implications presumably follow from other elements of trader costs, such as rents, telecommunications costs, and salaries of lawyers and translators.) The conclusion does not rule out the possibility, however, that the location and volume of trading are irrelevant to the determination of securities prices, beyond the epsilon-width band of arbitrage created by such costs. If location and trading volume are to have broader implications for securities prices, it is likely that imperfect information will have to play a role. It is considered below.

Timing around the globe—for example, the closing of New York markets at 4:00 P.M. (EST) and the opening of Tokyo markets approximately three or four hours later (9:30 A.M. Japan time)—offers a natural experiment to help answer a number of questions. Several researchers have noted the strengthened links between foreign markets and the U.S. market, particularly in the October 1987 crash and subsequently.[20] In chapter 7, Lin and Ito focus on the interrelation of price movements, volatility clusters, and trading volumes, between the New York and Tokyo markets. They consider trading volume a possible proxy for heterogeneous beliefs, since investors would not trade if all were identical. This study makes a contribution to the literature on correlation across markets, by testing under what circumstances the correlation is higher than others. It also makes a contribution to the literature on trading volumes, by testing the effects from one market to the next.

Lin and Ito consider two competing hypotheses regarding correlation across markets. The first is that markets are imperfectly liquid, so that when a "liquidity trader" wishes to sell a stock in a hurry, he or she is obliged to give up a bit of return, which goes to the other class of traders ("informed traders") as compensation. A testable implication of this hypothesis is attributed to Campbell, Grossman, and Wang (1993): that a temporary upsurge in trading volume should cause a temporary decrease in returns, followed by a rebound in the subsequent period (i.e., negative autocorrelation). Lin and Ito, however, after looking in vain for evidence that trading volume in New York has a negative

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20. For example, Eun and Shim (1989), King and Wadhwani (1990), and von Furstenberg and Jeon (1989). Shiller, Kon-ya, and Tsutsui (1991) conclude from a systematic study of questionnaires that Japanese traders in the crash were responding in an immediate sense to news about U.S. price movements per se, not to news about economic fundamentals.

effect on the correlation between the New York and Tokyo markets, do not favor this hypothesis.

The competing hypothesis is that Japanese traders correctly infer from New York price movements information that is relevant to the pricing of their own stocks. Lin and Ito find that the correlation across the markets goes up when the volatility in New York goes up, which they think may be evidence in favor of this second hypothesis. It is surprising, however, that the authors find no evidence that volatility in Tokyo is associated with volatility in New York, as they have found in earlier work on the foreign exchange market.[21] There is room for more research on the interaction of these variables. The use of direct data on the dispersion of beliefs among traders, as measured by the standard deviation of survey responses, might help.

Country Funds and Investor Sentiment

Most economists and finance specialists have long found unattractive the hypothesis that an important fraction of investors do not make full use of available information. After a decade of research into observed "anomalies" and some hard-to-explain upswings and crashes, however, there has recently been more serious consideration of the possible role of such factors as fads, bubbles, "noise traders," "feedback traders," and so on.

Gikas Hardouvelis, Rafael La Porta, and Thierry Wizman make a fascinating contribution to this volume in their study of country funds in chapter 8. These funds are well worth studying in their own right, as the leading wedge into some countries' emerging markets. By December 1992, U.S. investors could buy into twenty-six countries through one or more country funds traded on the New York Stock Exchange (NYSE) and American Stock Exchange (AMEX). The funds also offer a remarkable opportunity for one of the clearest tests to date of the Efficient Markets Hypothesis versus the hypothesis that noise traders are important.

It is always difficult to test whether the market price of a stock is equal to its fundamental value, because of the uncertainty regarding what is the correct model of the fundamental value. There is little doubt, however, that the market price of a fixed portfolio of equities ought to be equal to the net asset value of the portfolio, that is, the aggregate of the market prices of the individual stocks. Closed-end country funds are just such fixed portfolios, and yet their prices when traded in New York are observed to differ substantially from their net asset values expressed in dollars.

Previous authors have observed the discrepancy between country funds and their respective net asset values.[22] Hardouvelis, La Porta, and Wizman study

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21. Engle, Ito, and Lin (1990) use the term "meteor showers" to describe volatility clusters that persist, not only from one trading day to the next, but from one time zone to the next.

22. For example, Bonser-Neal, Brauer, Neal, and Wheatley (1990) and Diwan, Senbet, and Errunza (1993).

how it moves through time. To summarize briefly the outcome of a systematic and thorough analysis, the New York prices of country funds are observed in the short run to behave far more like the New York prices of other U.S. securities than to behave like the aggregated net asset value of the individual foreign securities that constitute the portfolio. Specifically, when there is a fluctuation in the exchange rate between the dollar and the currency of the local country in question, the country-fund price tends in the short run to follow the dollar, not the local currency. When there is a fluctuation in the price of the world stock market, or small U.S. stocks, again the country-fund price tends in the short run to follow the world portfolio or the U.S. stocks, not its respective local national stock market. Only slowly over time does the price converge to the net asset value as in theory it should right away. The weekly autoregressive coefficient is estimated at .89, for a half-life of five weeks. It is difficult to reconcile this behavior with the hypothesis of an efficient and frictionless world capital market.

Hardouvelis, La Porta, and Wizman interpret the data in terms of a model that allows for the presence of irrational investors, or noise traders. Collectively, these investors swing between being under- and over-optimistic about investment opportunities in particular foreign countries. In this context, the discount or premium on a country fund becomes a measure of the spontaneous pessimism or optimism with which U.S. investors view the country in question, relative to the investors within that same country.

Moreover, the common component of country-fund discounts or premia across all New York-traded funds becomes an aggregate measure of general U.S. sentiment for all foreign countries, relative to local sentiment. A widespread interpretation of the specific timing of the 1982 international debt crisis is that domestic investors in such heavily indebted regions as Latin America became concerned about future prospects of their countries, and moved large amounts of money out, at a time when northern investors were still enthusiastically lending. As one observes the renewed surge of capital into less-developed countries during the period 1990–93, therefore, one should consider whether it is based on a degree of enthusiasm among northern investors that is not shared by the locals, who may be better informed. Hardouvelis, La Porta, and Wizman observe a shift from discount to premium in 1990 in the prices of many country funds, which they attribute to contagious enthusiasm beginning with the fall of the Berlin Wall. It is interesting to note that discounts have particularly diminished or disappeared in Latin America and Central Europe since 1990. (In East Asia, on the other hand, premiums have fallen since 1990, suggesting that their stock market booms may have been led by domestic investors, rather than by foreigners.) One possible interpretation is that discounts and premiums are diminishing everywhere as restrictions are removed and the markets become more efficient. Another, more troublesome, interpretation is that U.S. investors may in 1990 have entered a temporary wave of enthusiasm for countries in Latin America and Central Europe.

In any case, the broadest lesson to be drawn from the country-fund study by Hardouvelis, La Porta, and Wizman is the same as that to be drawn from the other contributions to this volume. International equity markets offer a wealth of new data, unique questions, and useful answers. Empirical studies should not merely treat foreign equities as one more asset to be added to the menu of investments considered by insular U.S. residents. They should, rather, take due account of the diversity of assets offered by countries around the world, the diversity of locales in which the universe of investors live, and the diversity of institutional peculiarities that characterize the markets in which assets and investors are brought together.

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