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Measuring the Gains from International Portfolio Diversification

A remarkable feature of the world economy during the past several years has been the explosive growth in international flows of equities and bonds. For example, during the period 1984 to 1990, gross cross-border equity flows increased from approximately $300 billion per year to about $1.7 trillion, an annual rate increase of over 30 percent. Moreover, currently one out of seven equity trades worldwide involves a foreign party, while one out of ten U.S. equity trades takes place outside the United States. The numbers associated with the growth of the emerging markets of Southeast Asia are even more dramatic. During the period 1988 to 1993, it is estimated that capitalization of the Malaysian stock market increased from $15 billion to $76 billion, Thailand's market grew from $6 billion to $27 billion, and capitalization of the Indonesian stock market soared from $100 million to $10 billion, with most of the money flowing into these markets coming from foreigners.

On the face of it, these trends suggest that there must be large gains from international diversification. Before jumping to conclusions, though, it is important to realize that despite the recent surge in international equity *flows,* when cross-border equity holdings are expressed as a share of total wealth or income they remain quite modest; in particular, they are much smaller than most theories of optimal asset allocation would predict. This observation has led to recent research cautioning that the gains from international diversification might be much smaller than is commonly believed. How do we know which is true? On what factors does the answer depend? This *Letter* will briefly discuss the methods economists use to quantify the benefits from international asset trade. We will do so by attempting to answer the following hypothetical question: How much additional income per year would an investor require to forgo the opportunity to invest abroad?

Using the CAPM to measure the gains

In the early 1960s, William Sharpe (1964) and John Lintner (1965) developed the first formal, quantitative model of capital market risk and equilibrium, the now famous Capital Asset Pricing Model (CAPM). The essential insight of this model is that the risk of a given security has more to do with the covariance of its return with that of other assets than with the variance of its own return. This is because the part of a security's return that is uncorrelated with the return on other assets can be diversified away by holding a portfolio of the assets. If diversifiable risk were rewarded in the form of a higher expected return, investors would in effect receive a "free lunch." Competitive equilibrium in the capital market eliminates free lunches.

While the distinction between diversifiable and nondiversifiable risk provides the foundation for pricing risk in the CAPM, what makes the model useful are the assumptions that Sharpe and Lintner make concerning investors' preferences and beliefs. Sharpe and Lintner show that if investors care only about the mean and variance of the return on their portfolios, and share common beliefs about the future, then in equilibrium they will all end up holding an identical portfolio of risky assets, namely the "market portfolio," which is simply a value-weighted share of all (traded) assets.

The CAPM delivers an elegant, theoretically coherent approach to measuring the gains from portfolio diversification. In the CAPM, the equilibrium trade-off between risk and return is measured by the "Sharpe ratio," which is defined as the ratio of the rate of return on the market portfolio (in excess of the risk-free rate) to the standard deviation of this return. In other words, the Sharpe ratio tells us how much extra return an investor requires in order to take on an additional unit of risk. Thus, to quantify the gains to

international diversification, all we need to do is measure how the Sharpe ratio changes when we move from a market portfolio consisting of only domestic stocks to one consisting of both foreign and domestic stocks.

This calculation has been done by Tesar and Werner (1992). They consider stock market returns in the U.S., Japan, U.K., Germany, and Canada during the period 1980 to 1990. Their results imply that (assuming investors expect the future to be like the past) in order to persuade a U.S. investor to invest only in domestic assets, we would have to offer him a rate of return that is 3.2 percent higher than the U.S. market return. Alternatively, instead of offering the investor a higher return, we could simply supplement his income each year so that a "ban" on foreign investment doesn't make him any worse off. This provides a more direct measure of the gains from diversification. Of course, the required compensation will not be the same for everyone. Individuals who like to invest in the stock market will tend to demand a higher compensation than those who invest mainly in safe assets like T-bills. Still, we can get a rough picture of the gains by considering a "typical" investor who puts 25 percent of his wealth into safe assets and invests the remaining 75 percent in the stock market. Using results from Obstfeld (1992), it turns out that this investor would need a 7.3 percent increase in annual income as compensation for a ban on foreign investment. Although this might not seem like a large increase, remember the United States is currently a $6.5 trillion economy. Thus, a 7.3 percent increase in income translates into an annual benefit of $475 billion! The underlying source of this gain is the relatively weak correlation among national stock markets. For example, during this period correlations with the U.S. market ranged from a low of .29 in the case of Japan to a high of .75 in the case of Canada. To the extent that the correlation among stock markets has increased, the gains from diversification have decreased.

The conclusion that the gains from international diversification are large has been the conventional wisdom since the CAPM was first applied to international stock market data. This conclusion presents a puzzle, however. If the gains are so big, why aren't investors more internationally diversified? As noted earlier, despite the large recent flows into foreign equity markets, when expressed as a share of wealth or income, investor portfolios are still strongly biased toward domestic assets. In particular, they don't look anything like the value-weighted shares predicted by the CAPM. For example, the U.S. market constitutes roughly 40 percent of world stock market capitalization. The CAPM therefore predicts that U.S. residents should hold 60 percent of their (risky) portfolios in foreign equities. Instead, according to Tesar and Werner, U.S. residents only hold about 5 percent of their portfolios in foreign equities. Moreover, the discrepancy tends to be worse for other countries, whose stock markets are a much smaller share of the world market portfolio.

Why are investors' portfolios biased toward domestic assets? Unfortunately, quick fixes to the CAPM, like accounting for transactions costs and exchange rate risk, do not seem to work. If investors faced higher (variable) costs of transacting in foreign markets, we would expect them to trade foreign securities less. Instead, the opposite seems to be the case. Tesar and Werner found that turnover rates on the foreign-held component of national stock markets are much higher than on the domestically held component. This casts doubt on the role of transactions costs in producing home bias. Introducing exchange rate risk does not provide an explanation either, since investors can hedge most of this risk in the bond market. For example, consider a U.S. resident who owns Japanese stock. This investor faces the risk that the yen will depreciate, thus reducing the return when expressed in dollars. However, to hedge this risk the U.S. investor can borrow yen and lend dollars. Now if the yen depreciates, the loss on his holdings of Japanese stocks is offset by a gain from his yen loan (that is, he gets to pay back the loan with "cheaper" yen). Thus, exchange rate uncertainty should be reflected in a home bias in bond portfolios, not stock portfolios.

These considerations suggest that something fundamental is missing from the CAPM. Of the assumptions that Sharpe and Lintner make, one in particular is likely responsible for its inaccurate predictions; namely, the standard CAPM assumes that everyone produces and consumes the same goods. This is an especially dubious assumption in an international context because transportation costs and comparative advantage considerations tend to lead countries toward specialization. Interestingly, recent work has shown

that relaxing this assumption can dramatically reduce the predicted gains from international diversification.

Specialization, the terms of trade, and the gains from diversification

Cole and Obstfeld (1991) relax the assumption that countries produce identical goods. Instead, they assume that countries are specialized in the production of their own unique good. To incorporate risk, Cole and Obstfeld assume output is random, and therefore individuals residing in different countries want to pool their risks by exchanging equity claims.

Using this model, Cole and Obstfeld make an intriguing discovery. Perhaps the reason why countries are not more diversified internationally is that the gains to such diversification are small. How can this be? The crucial added feature in a world in which countries produce different goods is the possibility of changes in the "terms of trade" (that is, the relative price of foreign goods in terms of domestic goods). Cole and Obstfeld show that market-clearing movements in the terms of trade tend to provide "natural insurance" against domestic output fluctuations: When a nation's output declines unexpectedly, the shortfall in supply tends to raise its price, that is, the nation enjoys an offsetting improvement in its terms of trade. For example, even without equity trade, Brazil is partially insured against a bad coffee harvest, since a bad harvest will lead to higher coffee prices in the world market.

Naturally, the importance of this effect depends on how much the terms of trade adjust in response to relative output fluctuations. To quantify this effect Cole and Obstfeld simulate their model and find that offsetting movements in the terms of trade significantly reduce the gains from diversification. For example. when the terms of trade offset half the reduction in output, so that a 10 percent decline in relative output results in a 5 percent improvement in the terms of trade, Cole and Obstfeld's results imply that the gains from diversification decline by about 75 percent. Compared to the earlier results, this would imply an annual benefit of "only" $119 billion.

Conclusion

What have we learned? First, by the usual standards of cost-benefit analysis, the gains from international diversification are quite large. Second, the work of Cole and Obstfeld suggests that a nation's benefit from diversification likely depends on its economic size. Small countries, whose terms of trade are dictated by the world market, are likely to benefit relatively more than large countries. This is because large countries like the U.S. and Japan tend to receive natural insurance against output fluctuations via offsetting terms of trade changes. Thus, an important topic for future research is to estimate econometrically the actual magnitude of the terms of trade effect in order to obtain a more precise measure of the gains from diversification for large countries like the United States.

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