

## ADVANTAGES OF INTERNATIONAL PORTFOLIO DIVERSIFICATION

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### ABSTRACT

An investor opts for international portfolio investment because international diversification of portfolio of assets helps achieve a higher risk adjusted return. This means that an investor is able to reduce risk and raise return through international investment. The evidence shows considerable independence between different countries' stock returns, suggesting large gains from international diversification. Portfolios that are internationally diversified do indeed prove to have lower volatility than portfolios of domestic stocks of the same size.

Inclusion of international portfolio gives an added advantage in that it helps to reduce risk as well as to raise return. There are, of-course, risks associated with changes in the exchange rate, unfamiliarity with the environment in the foreign countries and various measures of exchange control adopted by the governments concerned but the benefits from international diversification out-weights the costs or risks. Even if internationally diversified portfolios are not hedged against exchange rate risk, they show lower volatility than domestically diversified portfolios. If assets are priced in internationally integrated capital markets, their returns are appropriate for their risk when combined with the world market portfolio. Then, by not diversifying internationally, an investor is accepting more risk than is necessary for a given expected return, or lower expected return than is necessary for a given risk. If capital markets are segmented, those who can overcome the cause of segmentation and invest abroad can enjoy abnormal returns for the risk taken. This is because assets are then priced only to compensate for the risk in internationally undiversified portfolios. We have discussed the advantages of international portfolio diversification in detail, in this paper.

**KEYWORDS:** International, Portfolio, Risk, Return, Investor, Diversified, Stock etc.

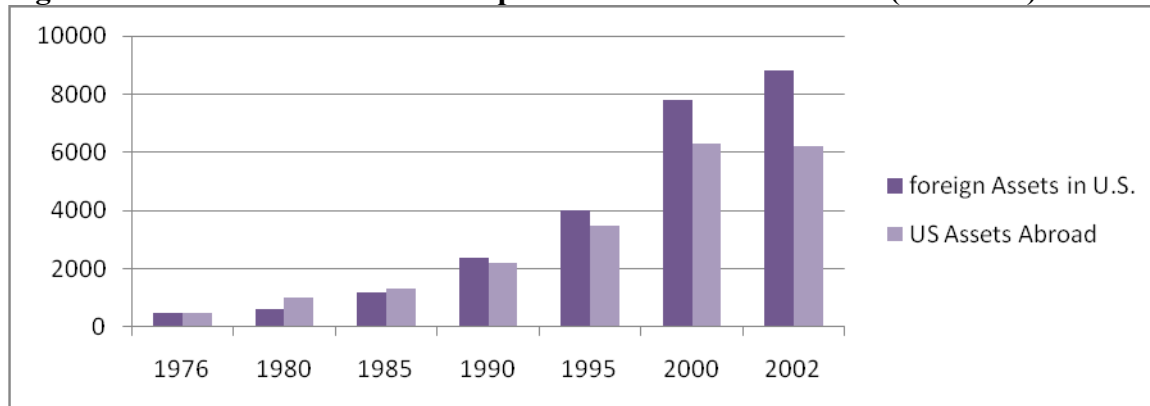
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### Introduction

Among the rewards of the globalization of investment has been an improvement in the efficiency of the global allocation of capital and an enhanced ability to diversify investment portfolios. The efficiency gain from the better allocation of capital arises from the fact that international investment reduces the extent to which investments are high returns in some countries are

forgone for want of available capital, while low return investments in other countries with abundant capital go ahead. The flow of capital between countries moves marginal rates of return in different locations closer together, thereby offering investors at home and abroad overall better returns. There is an additional gain from increased international capital flows enjoyed via an enhanced ability to smooth consumption over time by international lending and borrowing: countries can borrow abroad during bad years and pay back in good years.

**Figure: -1 International investment position of the United States (\$ Billions)**



**Note:**

In the mid-1980s the United States switched from being an international net creditor nation to an international net debtor. By the new millennium this net debt position had grown to over two trillion dollars.

**Source:** *Survey of current business*, US Department of Commerce, office of Business Economics, 2003.

Diversified international investment offers investors higher expected returns and/ or reduced risks vis-à-vis exclusively domestic investment. Here we will discuss the sources and sizes of these gains from venturing overseas for portfolio investment, which is investment in equities and bonds where the investor’s holding is too small to provide any effective control.

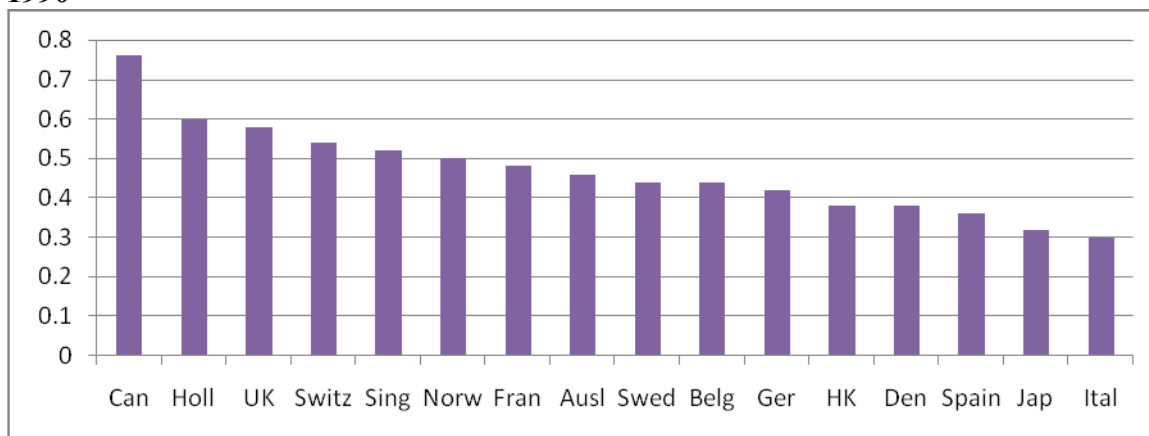
**❖ The Advantages of International Portfolio Diversification**

**1. Spreading risk: Correlations between national asset markets**

Because of risk aversion, investors demand higher expected returns for taking on investments with greater risk. It is a well-established proposition in portfolio theory that whenever there is imperfect co-relation between different assets’ returns, risk is reduced by maintaining only a portion of wealth in any individual asset. More generally, by selecting a portfolio according to expected returns, variances of returns, and co-relations between returns, an investor can achieve minimum risk for a given expected portfolio return, or maximum expected portfolio return for a given risk. Furthermore, ceteris paribus, the lower are the co-relations between returns on different assets, the greater are the benefits of portfolio diversification.

Because of different industrial structure in different countries, and because different economies do not trace out exactly the same business cycle, there are reasons for smaller co-relations of expected returns between investments in numerous different countries than between investments within any one country. This means that foreign investments offer diversification benefits that cannot be enjoyed by investing only at home, and for example, that a US investor might include British stocks in a portfolio even if they offer lower expected returns than US stocks; the benefit of risk reduction might more than compensate for lower expected returns.

**Figure: -2 Correlations between US and other countries' stock markets, US dollars, 1980-1990**



**Notes:**

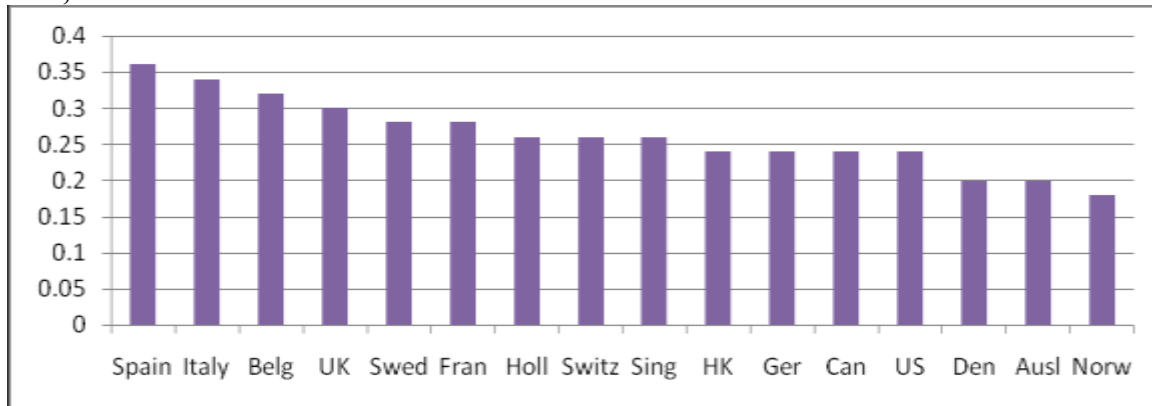
The US stock market is not very highly correlated with stock markets in other countries: correlation coefficients average about 0.5. These relatively low correlations mean a potential gain from holding an internationally diversified portfolio of stocks.

**Source:** Patrick Odier and Bruno Solnik, "Lessons for International Asset Allocation," *Financial Analysts Journal*, March/ April 1993, pp. 63-77; ©CFA institute.

Figure-2 graphically illustrates the degree of independence of foreign versus UK stock markets as reported by Patrick Odier and Bruno Solnik.<sup>1</sup> The coefficients in the figure are based on US dollar values of stock markets, and have an average of about 0.5. This means a squared-correlation, called  $R^2$ , of 0.25. The  $R^2$  statistic is an indicator of the extent to which two variables- in this case two countries' stock markets- respond jointly to common factors.

Figure 2 suggests that different countries' stock markets have substantial idiosyncrasies of returns; with  $R^2 = 0.25$ , 75% of returns are due to factors specific to individual countries. In principle, the low correlations that are found could be the consequence of different economic and political events in different countries, or of different countries' stock market indexes being formed from dissimilar mixes of industries.

**Figure: -3 Correlations between Japanese and other countries’ stock markets, Japanese Yen, 1980-1990**

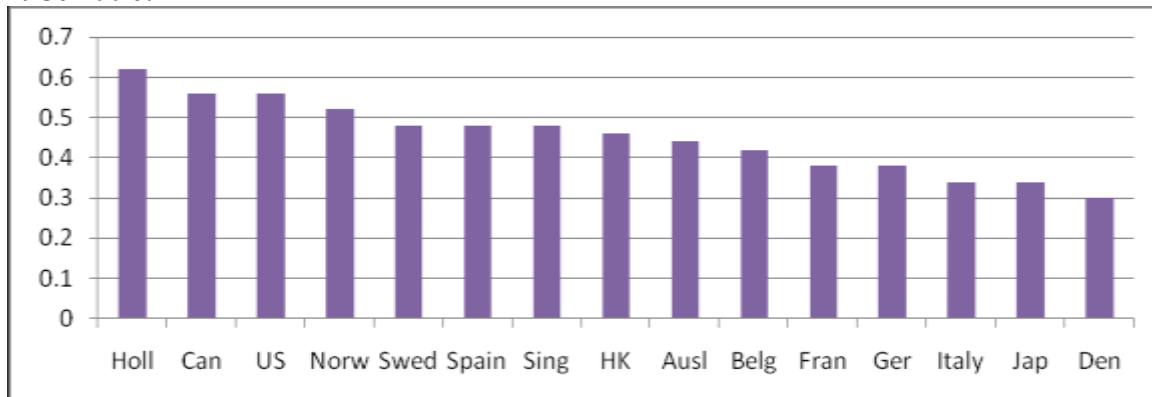


**Notes:**

Japan’s stock market follows a path which appears to be quite independent of the stock markets of other countries, with correlation coefficients averaging about 0.2. This situation suggests substantial potential benefits for Japanese investors from holding an internationally diversified stock portfolio.

**Source:** Parick and Bruno Solnik, “Lessons for International Asset Allocation,” *Financial Analysts Journal*, March/ April 1993, pp. 63-77; ©CFA institute.

**Figure -4 Correlations between British and other countries’ stock markets, British pounds, 1980-1990.**



**Notes:**

The British stock market is correlated with stock markets of other countries to about the same extent as is the US stock market, with correlation coefficients averaging about or slightly below 0.5. As is the case for investors from the United States, Japan and other countries, British investors stand to benefit for international diversification.

**Source:** Parick and Bruno Solnik, “Lessons for International Asset Allocation,” *Financial Analysts Journal*, March/ April 1993, pp. 63-77; ©CFA institute.

Figures 3 and 4 show, respectively, the correlation coefficients between the Japanese and non-Japanese markets, and between the British and non-British markets. We see that is not only the United States which has a major idiosyncratic element in its stock market. Indeed, for Japan in particular, the very low correlation coefficients- averaging less than 0.2- suggest that less than 4% of the factors behind the Japanese stock market are affecting other stock markets. (The  $R^2$  for Japan is approximately  $0.02*0.02=0.04$ , or only 4%).

**2. Country-specific volatility versus industrial structure** Two possible explanations for the generally low correlations between different countries' stock markets are:

- i) That the countries' economies evolve differently over time with different business cycles.
- ii) That the countries have different industries in their stock market indexes.

In the latter case, the low correlations between overall stock market indexes could occur despite firms in a given industry, but in different countries, having highly correlated stock values; high correlations within industries might be swamped by low correlations between industries. Evidence suggesting that the low correlations are not due to different industrial compositions of different countries' market indexes is shown in table 1 and 2.<sup>2</sup> The tables show correlation coefficients between monthly returns measured in US dollars of major firms in given industries, but from different countries.

**Table-1 Correlations between US dollar monthly returns in automobile manufacturing, 1986-1991.**

	GM	Ford	Chrysler	Fiat	Volkswagen	Peugeot	Honda	Nissan
GM	1.0000							
Ford	0.8020	1.0000						
Chrysler	0.6829	0.6150	1.0000					
Fiat	0.4909	0.3541	0.3393	1.0000				
Volkswagen	0.4016	0.3350	0.2604	0.6177	1.0000			
Peugeot	0.4517	0.4105	0.2994	0.5166	0.6347	1.0000		
Honda	0.2321	0.2195	0.1635	0.4162	0.1755	0.2503	1.0000	
Nissan	0.2980	0.2505	0.3722	0.3908	0.1947	0.2837	0.5957	1.0000

**Source:** Tania Zouikin, "Is International Investing Losing its Lustre?" *Canadian Investment Review*, winter 1992, p.18.

We see from Table 1 that correlations between automobile manufacturers in different countries are low. For example, Honda and GM have a correlation coefficient of only 0.23. Table 2 shows a similar pattern in the consumer electronics industry. With firms in given industries but different countries offering such different return experiences, international portfolio diversification offers significant potential.

**Table-2 Correlations between US dollar monthly returns in the consumer electronics industry, 1986-1991.**

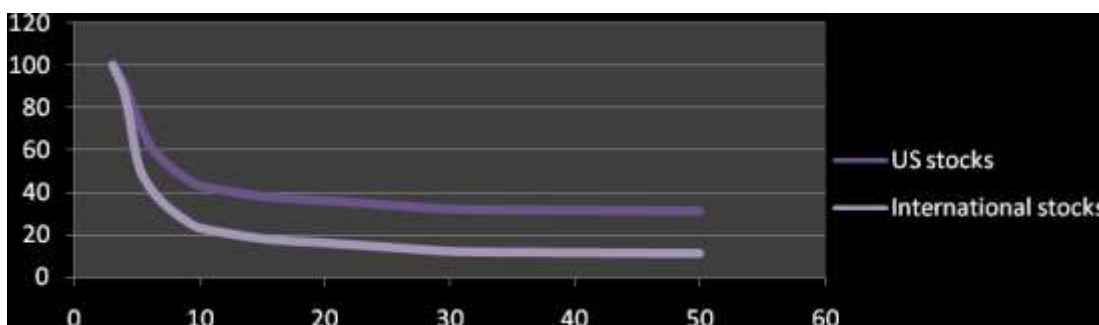
	GE	Zenith	Philips	Siemens	Matsushita	Sony
GE	1.0000					
Zenith	0.4816	1.0000				
Philips	0.4295	0.3931	1.0000			
Siemens	0.4938	0.5389	0.5389	1.0000		
Matsushita	0.2562	0.1915	0.1885	0.1657	1.0000	
Sony	0.2035	0.1389	0.1108	0.2062	0.8286	1.0000

**Source:** Tania Zouikin, “Is International Investing Losing its Lustre?” *Canadian Investment Review*, winter 1992, p.18.

### 3. Increased size of the gain from stock diversification

An indication of the size of the gain from including foreign stocks in a portfolio has been provided by the research of Bruno Solnik.<sup>3</sup> Solnik computed the risk of randomly selected portfolios of n securities for different values of n in terms of the volatility of these portfolios. For example, a large number of portfolios of two randomly selected companies were formed, and their return and volatility calculated. Then, portfolios of three randomly selected companies were formed, with average returns and volatilities calculated, and so on. As expected, it was found that volatility declines as more stocks are included. Moreover, Solnik discovered that an international portfolio of stocks has about half as much risk as a portfolio of same size containing only US stocks. This result is shown in figure 5.

**Figure 5 The size of the gain from international Diversification** (Risk % on Y axis and number of stocks on X axis)



**Note:**

For any given number of stocks, an internationally diversified portfolio typically has less than half the risk of a domestically diversified portfolio.

**Source** Bruno H. Solnik, “Why Not Diversify Internationally Rather Than Domestically?” *Financial Analysts Journal*, July/ August 1974, pp. 48-54; ©CFA institute.

We see that the risk of US portfolios of over 50 stocks is approximately 25% of the risk of a typical security, whereas the risk of a well-diversified international portfolio is only about 12%

of that of typical security. When Solnik considered other countries which have far smaller stock markets, he found that the gains from international diversification were, not surprisingly, much larger than for the US. In smaller countries there is less opportunity to diversify within the country than in larger countries. For example, in the US it is possible to invest in most of the world's industries, something you could not do in a small country such as Denmark or Egypt. Furthermore, in large countries, such as the United States and Britain, there are often numerous multinational corporations trading on their stock markets. As we shall see, this means that investors holding only "domestic" stocks are actually achieving international diversification indirectly because of the extensive overseas activities of their own countries' companies. However, the evidence indicates that there are opportunities for further diversification by venturing into foreign stock markets even for the United States.

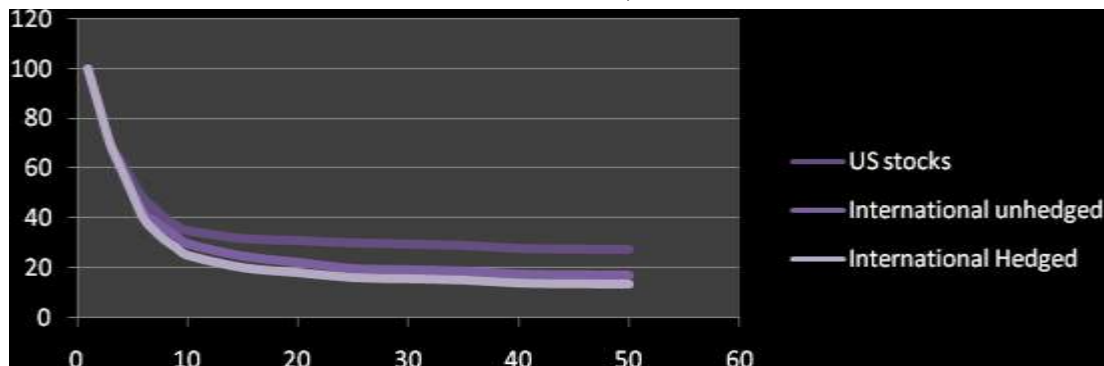
#### **4. Reduced risk from exchange rates**

While there are gains from international diversification because of the independence between foreign and domestic stock returns, there is a possibility of added risk from unanticipated changes in exchange rates when foreign stocks are held.

It is important to confirm whether this completely nullifies the benefits from international diversification from the presence of some independence between stock market returns in different countries. The answer is no. One reason is that it is possible to diversify internationally without adding exchange rate exposure- by hedging in the forward market, by borrowing in the foreign currencies, or by using futures or currency options. The hedges would have to be based on the exposure in each currency, as given by regression coefficients. A second reason why international portfolio diversification is beneficial despite exchange-rate variability is that, even without hedging, the variance of dollar return on an internationally diversified portfolio of stocks remains lower than the variance of the expected dollar return investing in the domestic stock market. This has been shown by Bruno Solnik, who compared the variance of returns on portfolios of US stocks with the variance of returns on internationally diversified portfolios, both when not hedging exchange- rate exposure and when hedging in the forward market.<sup>4</sup>

Different-sized portfolios of US stocks and internationally diversified stocks were compared, with the results shown in figure 6.

**Figure-6 The advantages of international diversification with and without exchange risk**  
(Risk % on Y axis and number of stocks on X axis)



#### Note

There are further gains from risk reduction through international diversification if forward markets are used to hedge exchange-rate risk.

**Source:** Bruno H. Solnik, “Why Not Diversify Internationally Rather than Domestically?” *Financial Analysts Journal*, July/ August 1974, pp. 48-54; ©CFA institute.

This figure reveals that even though there is exchange rate risk- given by the gap between the hedged and un-hedged curves- it is still better to diversify internationally than to hold only US stocks. It is clear that the gain from having independence of returns due to holding securities of different countries in a portfolio more than offsets any exchange rate risk that this implies, even when not hedging. And, of course, when hedged the benefits from international portfolio diversification are even greater.

#### 5. Gain in International Capital Asset Pricing

The central international financial question concerning the pricing of assets, and hence their expected rates of return, is whether they are determined in an **integrated international capital market** or in local **segmented** markets. If assets are priced in an internationally integrated capital market, expected yields on assets will be in accordance with the risks of the assets when they are held in an efficient, internationally diversified portfolio, such as the world market portfolio. This means that while in such a situation it is better to diversify internationally than not to.

On the other hand, if assets are priced in segmented capital markets, their returns will be in accordance with the systematic risk of their domestic market. This means that if an investor happens to have an ability to circumvent whatever it is that causes markets to be segmented, this investor will be able to enjoy special benefits from international diversification. It is consequently important for us to consider whether assets are priced in internationally integrated or in segmented capital markets. However, before doing this it is useful to review the theory of asset pricing in a domestic context, because if we do not understand the issues in the simpler domestic context, we cannot understand the international dimensions of asset pricing.



### **The domestic capital asset pricing model, CAPM**

The domestic variant of the **capital asset pricing model (CAPM)**, familiar from the so-called “beta analysis” used in security selection, can be written as follows<sup>5</sup>.

$$R_j^* = r_f + \beta (r_m^* - r_f)$$

Where

$$\beta = \frac{\text{cov}(r_j, r_m)}{\text{var}(r_m)}$$

and where

$r_j^*$  = equilibrium or required expected return on security or portfolio **j**

$r_f$  = risk free rate of interest

$r_m^*$  = expected return on the market portfolio **m**

$\text{cov}(r_j, r_m)$  = covariance between security or portfolio **j** and the market **m**

$\text{var}(r_m)$  = variance of the market portfolio.

### **The international capital asset pricing model, ICAPM**

With the domestic variant of the CAPM explained, we can clarify the conclusion stated earlier about internationally integrated versus segmented markets. If assets are priced in internationally integrated capital markets, expected yields are given by

$$r_j^* = r_f + \beta^w (r_w^* - r_f)$$

Where

$$\beta^w = \frac{\text{cov}(r_j, r_w)}{\text{var}(r_w)}$$

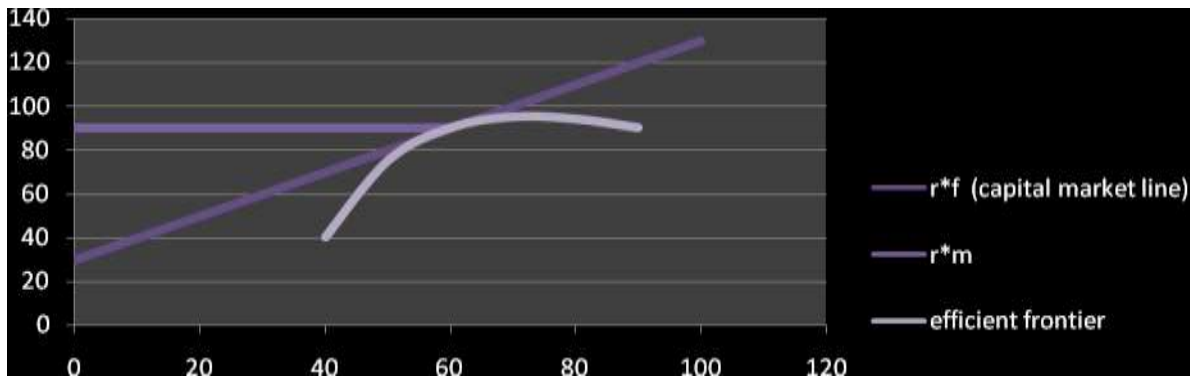
and where

$r_w^*$  = “world market” expected returns.

### **Segmentation versus integration of capital markets: a graphical view**

The implications of integrated versus segmented capital markets can be viewed graphically in terms of the risk-return framework that is used frequently in the domestic context to describe diversification benefits.

**Figure-7 The relationship between expected return and total risk**  
 (risk on X axis and Expected return on the Y axis)



**Notes:** if assets are priced in segmented markets, it may be possible for an investor to enjoy a combination of expected return and risk above the capital market line for a particular country if the investor can overcome the causes of segmentation and diversify internationally. If assets are priced in internationally integrated capital markets, then by not diversifying internationally an investor will be accepting higher risk and/ or lower return than is necessary.

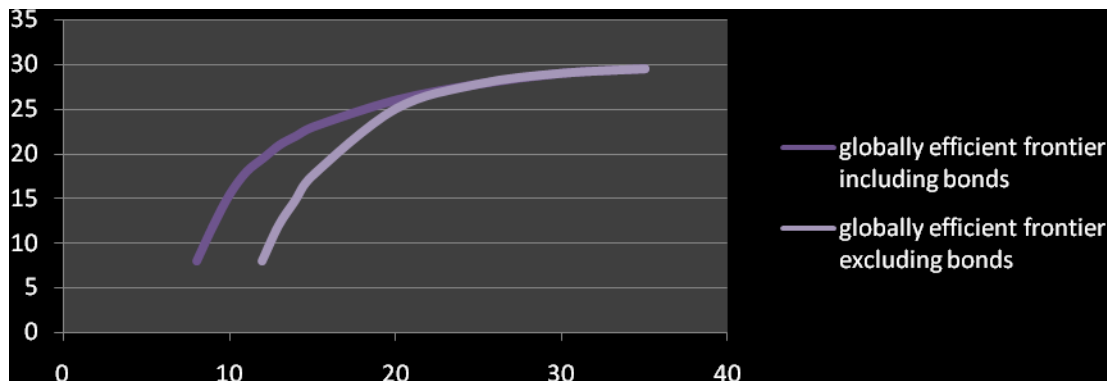
Figure 7 shows expected return on the vertical axis, and total risk, given by the standard error,  $\sigma$ , of expected returns, on the horizontal axis. The upward sloping part of the curve, or the envelope, gives the best combinations of expected returns and risk that can be achieved with different portfolios: combinations of risk and return along the envelope above the minimum value of  $\sigma$  are those of efficient portfolios. As before,  $r_f$  is the risk-free interest rate, and  $r_m^*$  is the expected return on the market portfolio. Again as before, the interpretation of  $r_f$  and  $r_m^*$  depends on whether we are considering integrated or segmented capital markets. We note that  $r_m^*$  is the tangency point on a straight line drawn between the risk-free rate and the envelope of efficient portfolios' risks and returns. This line is the capital market line, which gives the expected returns and risks of combinations of the risk-free asset and the market portfolio. It is a well-known proposition in finance that an investor cannot do better than select such a combination and therefore be somewhere on the capital market line.

If capital markets are internationally integrated, then we can interpret  $r_f$  in figure 7 as the risk free rate, and  $r_m^*$  as the expected world market return,  $r_w^*$ . That is, with integrated capital markets the ICAPM is an extension of the domestic CAPM where we reinterpret  $r_m^*$  as the expected world market return,  $r_w^*$ . Indeed, if the capital market is integrated, by not holding the world market portfolio the investor will be below the capital market line in figure 7; the investor could reduce risk and increase expected return by holding the world portfolio. On the other hand, if capital markets are segmented so that we can interpret  $r_m^*$  as the expected return in the domestic market, then by overcoming the obstacles to foreign investment an investor might be able to create a risk-return portfolio that is above the domestic capital market line. For example, the investor might be able to reach a point such as A and enjoy gains from international diversification, since these are not priced by the market due to segmentation.

## 6. Gain from International Portfolio Diversification In Case of Bonds

The empirical importance of international portfolio diversification of bonds is addressed in figure 8.

**Figure 8 Contribution of bonds to the globally efficient frontier, US Dollars, 1980-1990**  
(Risk % per year on the X axis and Return & per year on the Y axis)



### Notes

Including bonds as well as stocks in an internationally diversified portfolio provides an opportunity to reduce risk for a given return vis-à-vis a stock only portfolio. The benefit from holding bonds comes despite the relatively high exchange-rate risk on bonds.

### Source:

Patrick Odier and Bruno Solnik, "Lessons for international Asset Allocation," *Financial Analysts Journal*, March/ April 1993, pp. 63-77; © CFA Institute.

The figure shows two efficiency frontiers, one for optimally internationally diversified portfolio of stocks only, and other for stocks plus bonds. The frontier when bonds are included in the portfolio shows reduced risk for given returns. The reduction in risk does not, of course, occur at high rates of return because to achieve such returns it is necessary to hold only stocks. The lower expected returns the advantage of including bond is substantial, with, for example, a volatility reduction from 12% to 8% at a 10% rate of return. The position of the combined stock and bond efficiency frontier in figure 8 makes the gains from international portfolio diversification very evident.

The international investment helps raise the return with a given risk and/ or helps lower the risk with a given rate of return. This happens because more profitable investment avenues exist in an enlarged universe; and at the same time, the inter-country dissimilarities, as discussed above, reduce the risk. The empirical findings of Eaker and Grant (1990) based on a comparison between domestic investment entirely in the USA on the one hand, and the foreign-mixed investment on the other, reveal that with a gradual increase in foreign portfolio, returns from the investment increased. The process continued till the ratio of the foreign portfolio reached 60% of the total portfolio<sup>6</sup>.

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