

A Note on
Benefits of Diversification and Integration
for International Equity and Bond Portfolios

Michael Schröder

Centre for European Economic Research /
Zentrum für Europäische Wirtschaftsforschung (ZEW)

January 2002

Acknowledgment:

The author gratefully acknowledges financial support from the European Financial Services Roundtable, Brussels.

Address:

P.O. Box 103443, D-68034 Mannheim, Germany
Tel.: ++49/621/1235-140, Fax: -223, Email: schroeder@zew.de

1. Introduction

It is well known from portfolio theory that pure domestically invested asset portfolios are usually sub-optimal. If for example a private household in France invests only in French equities she will have a lower return-to-risk ratio than compared to a world-wide investment. As this is true in general for all types of investors, countries and assets, a better diversification should improve the performance of investments.

Capital market integration and diversification are connected in several ways. In a fully integrated capital market all risk factors trade at the same price. This means, for example, if the European capital markets were fully integrated then the business cycle risk or the inflation risk would have the same price in all European capital markets. Capital market integration means in other words that the law of one price is fully applicable to all traded assets. This per se should have a positive effect on the functioning of financial markets and indirectly on the performance of investments.

But integration of capital markets has also a more basic meaning: free access to foreign financial markets. Formally, all Europeans have full access to all other European and most of the non-European capital markets. But nevertheless only a small part of total assets of private households is invested in marketable assets such as equities and bonds. And there is also the well-known tendency to invest a very large position in the home country. One part of this so-called home bias is that private as well as institutional investors prefer investments in equities and bonds denominated in the own currency. Since the introduction of the Euro this obstacle to foreign investments is abolished. But nevertheless it will take some time until investors will change the composition of their investment portfolios.

Another possible cause of the home bias-phenomenon is information asymmetry. Usually investors are better informed and have lower information costs for domestic assets (equities as well as bonds). As the European Monetary Union will not change this information asymmetry, further activities are needed to overcome this problem. This is part of the FSAP which intends to harmonise e.g. accounting standards, listing requirements at the securities exchanges and other institutional arrangements. In addition, there are usually also higher transaction costs for trading foreign assets compared to domestic investments. In the opinion of private households these additional transaction costs might be too high to make foreign investments profitable. Better integrated European financial markets and an increase in competition across borders should diminish the differences between domestic and foreign investment costs. Thus, integration of financial markets in Europe could- at least to some part – reduce the home bias of European investors.

2. Characteristics of International Stock and Bond Portfolios

More internationally diversified stock and bond portfolios should as a consequence shift the frontier of efficient portfolios upwards and therefore for each given risk the average portfolio return should increase. Thus, more integrated capital markets should lead to a larger portion of foreign stocks and bonds in the portfolios with the effect of better diversified investments. The following analysis tries to quantify the possible additional performance of stock and bond portfolios of European investors when the home bias is diminished in the future.

Tables 1 – 4 show the return/risk-relationships of different portfolios for German, French British and US investors. The return/risk relationships are shown both for portfolios without

currency hedge and with fully hedged currency exposures. The performance of the equity portfolios is calculated using the market capitalization weights and the country indices of Morgan Stanley (MSCI), whereas the bond portfolios refer to the capitalization weights and country indices of Salomon. All figures of the Tables 1 – 6 have been calculated using monthly returns.

Table 1 shows for a German investor that world-wide and European-wide diversified equity and bond portfolios performed much better than portfolios restricted to only German assets. This can be seen from the so called Sharpe ratios that are much higher when foreign assets are included in the portfolio. The Sharpe ratio is defined as the portfolio return minus a risk-free interest rate, divided by the standard deviation, which serves as the measure of risk. The Sharpe ratio therefore measure reward or premium which the investor earns for one of risk. The higher the Sharpe ratio the better is the performance of the portfolio.

The best performing stock and bond portfolios are those with a diversification amongst Europe-wide assets. The inclusion of other international assets is somewhat less profitable than using only European assets, which can be seen from the lower Sharpe ratios of the World Portfolios. For a German investor holding foreign currencies resultet in additional diversification benefits. This is in contrast to the results for French, British and US investor which could significantly benefit from a full currency hedge in all portfolios shown in Tables 2 – 4. This is particularly true for British and US investors that could increase the Sharpe ratios of their portfolios by a very large amount due to avoiding the risk of foreign currencies.

Table 1: Return/Risk Relationships for a German Investor (Period: January 1978 – June 2001)

	Mean Return (in %, p.m.)		Standard Deviation (in %, p.m.)		Sharpe Ratio	
	Unhedged	Hedged	Unhedged	Hedged	Unhedged	Hedged
Equities World	1.14	1.00	4.79	3.87	0.139	0.136
Equities Europe	1.16	1.05	4.57	4.43	0.149	0.133
Equities Germany	0.95	--	5.57	--	0.085	--
Bonds World	0.71	0.58	2.10	1.29	0.113	0.079
Bonds Europe	0.68	0.58	1.37	1.21	0.150	0.095
Bonds Germany	0.56	--	1.34	--	0.063	--

Besides currency hedging, the figures of Table 2 show a result for French investors that is very similar to those for German investors: The best performing portfolios consist of Europe-wide diversified stocks or bonds. The World Portfolio is again only second best, although it has a significantly higher Sharpe ratio than a portfolio that consists only of domestic assets. For British investors (Table 3) the world-wide invested stock and bond portfolios are slightly better behaved than portfolios that are invested only in European assets. Looking at the bond portfolios there is a surprisingly large difference between portfolios with and without currency hedge. This is due both to a higher return of the hedged portfolio and a lower standard deviation.

Table 2: Return/Risk Relationships for a French Investor (Period: January 1978 – June 2001)

	Mean Return (in %, p.m.)		Standard Deviation (in %, p.m.)		Sharpe Ratio	
	Unhedged	Hedged	Unhedged	Hedged	Unhedged	Hedged
Equities World	1.28	1.25	4.70	3.90	0.119	0.134
Equities Europe	1.30	1.29	4.52	4.38	0.127	0.131
Equities France	1.40	--	6.03	--	0.112	--
Bonds World	0.86	0.83	2.08	1.34	0.064	0.076
Bonds Europe	0.82	0.83	1.49	1.20	0.067	0.089
Bonds France	0.79	--	1.56	--	0.042	--

Table 3: Return/Risk Relationships for a British Investor (Period: January 1978 – June 2001)

	Mean Return (in %, p.m.)		Standard Deviation (in %, p.m.)		Sharpe Ratio	
	Unhedged	Hedged	Unhedged	Hedged	Unhedged	Hedged
Equities World	1.22	1.30	4.55	3.88	0.095	0.132
Equities Europe	1.23	1.35	4.42	4.36	0.101	0.129
Equities UK	1.23	--	4.92	--	0.091	--
Bonds World	0.79	0.94	2.50	1.28	0.001	0.127
Bonds Europe	0.75	0.89	2.34	1.12	-0.012	0.094
Bonds UK	0.91	--	2.41	--	0.051	--

As for French and British investors, holding foreign currencies has not added value to the stock and bond portfolios of a US investor (Table 4). But unlike the other investors an international diversification of equities seems not to create large benefits for a US-based investor.

In sum, there are large differences between the performance of asset portfolios of the four investors analyzed in the Tables 1 – 4. The optimal decision concerning currency hedging depends largely on the domestic currency of the investor. Since the introduction of the Euro there should be from then on only one optimal portfolio irrespective of the location of the investor. This not only concerns currency hedging but also the composition of stocks and bonds. The necessary degree of diversification (Europe-wide or world-wide) to create an optimal portfolio, although different across investors and assets in the past, has now the same solution for all investors located in Euroland.

Table 4: Return/Risk Relationships for a US Investor (Period: January 1978 – June 2001)

	Mean Return (in %, p.m.)		Standard Deviation (in %, p.m.)		Sharpe Ratio	
	Unhedged	Hedged	Unhedged	Hedged	Unhedged	Hedged
Equities World	1.11	1.13	4.02	3.91	0.119	0.130
Equities Europe	1.12	1.17	4.69	4.40	0.106	0.123
Equities USA	1.18	--	4.40	--	0.125	--
Bonds World	0.68	0.73	2.55	1.28	0.023	0.085
Bonds Europe	0.64	0.73	3.30	1.10	0.006	0.097
Bonds USA	0.66	--	2.49	--	0.015	

The analysis also shows that there is a clear answer to the question whether international diversification matters: holding only domestic assets is only an inferior solution. The performance of the portfolios could be significantly improved by investing in international stocks and bonds. It is also interesting to note, that the a Europe-wide diversification for stock and bond portfolios leads to the best results. A world-wide diversified stock portfolios could cause lower risk-adjusted returns to the investor than a Europe portfolio. This is a very promising result concerning the integration of European capital markets: a better diversification amongst European equity markets is the best a Europe-based investor can do.

3. Stability of Diversification Benefits and Possible Gains for Investors

Table 5 shows the stability of diversification benefits over time. The figures are calculated as the difference of the Sharpe ratios of the World or Europe Portfolios to the fully locally invested portfolio. As all portfolios are calculated without currency hedge the figures slightly underestimate the true benefits of diversification for British, French and US investors. There are two results that can be derived from this Table. First, the benefits of diversification change significantly over time. And second, besides the US investor, the benefits of diversification are always existent. Therefore, the investors could mostly increase the performance of their portfolios by investing in international asset.

Table 5: Stability of Diversification Benefits over Time, Difference of Sharpe Ratios of World and Europe Portfolios relative to a Local Portfolio (Unhedged Currency Returns)

	Jan. 78 – June 01	Jan. 89 – June 01	Jan. 95 – June 01
Equities World			
British Investor	0.004	0.009	0.012
French Investor	0.007	0.014	0.012
German Investor	0.054	0.031	0.071
US Investor	-0.006	-0.071	-0.078
Equities Europe			
British Investor	0.011	0.008	0.003
French Investor	0.015	0.015	0.018
German Investor	0.064	0.032	0.078
US Investor	-0.019	-0.086	-0.093

In Table 6 the excess returns of the optimal portfolio is compared to a purely locally invested stock portfolio for each investor. The excess return measure the average premium earned in excess of the risk free interest rate. The excess return of the optimal portfolio is compared to (1) the return of a portfolio with 80% domestic stocks and 20% world-wide diversified stocks and (2) a portfolio that consists only of domestic stocks. To calculate the excess returns of columns 3 and 4 the risk is fixed to the standard deviation of the optimal portfolio. The composition of the optimal portfolio is given in column 2 in brackets (domestic:foreign).

The optimal portfolio of the German investors is simply the World Portfolio, the French investor should hold 70% in French equities and 30% in the World Portfolio and the optimal portfolio of the British investor consists of 10% of the domestic and 90% of the World Portfolio. All three investors should therefore invest a relatively large part of their total investment in foreign assets. Only the US investors cannot significantly improve the portfolio performance by investing abroad: he should hold 100% in domestic equities.

Table 6: Mean Excess Return of Risk adjusted Portfolios (Portfolio Risk equal to Standard Deviation of Optimal Equity World Portfolio), Period Jan. 95 – June 2001

	Optimal Equity World Portfolio ¹ (Domestic:Foreign)	80:20 Portfolio	Local Investment
British Investor ¹	0.78% (10:90)	0.60%	0.52%
French Investor ¹	1.069% (70:30)	1.066%	1.05%
German Investor ²	1.21% (0:100)	0.96%	0.86%
US Investor ¹	0.96% (100:0)	0.94%	0.96%

Notes: ¹World portfolio is fully currency hedged, ²World portfolio is not currency hedged.

Table 6 shows the additional excess return that can be gained by a better diversification of the portfolio. The 80:20 portfolio can serve as an approximation of the actual investment position of the investors.² The highest additional excess return could have been earned by a German investor: 0.25% per month = 3% per year = 82% in 20 years! Although the possible improvements of the portfolio return of the British investor are not that impressing, they are nevertheless significant: 0.18% per month = 2.2% per year = 54% in 20 years. For the French investor the additional earnings are rather small and for the US investor equal to zero.

To sum up, international diversification results in significant additional returns for the investors under consideration (except the US investor). Although these additional returns are time-varying and different according to the currency of the investor, a better international diversification improves the portfolio performance. A Europe-wide diversification leads to a significant increase in the Sharpe ratio, which is in most cases even higher than the improvement due to a world-wide diversification. Therefore, a further integration of European capital markets that diminishes the home bias should result in higher portfolio returns for European investors.

Literature

Brealey, R., I. Cooper and E. Kaplanis (1999): What is the International Dimension of International Finance?, *European Finance Review* 3, pp. 103-119.

¹ The optimization has been done only with respect to the weights of the domestic equity portfolio. A full optimization that includes all weights of the world portfolio should result in even higher excess returns for the optimal portfolio.

² For example Brealey et al. (1999) show that in 1993 the following investment positions held for the different investor in domestic equities: German – 78%, French – 92%, UK – 69%, US – 95%.