ADVANTAGES AND LIMITATIONS
OF INTERNATIONAL
PORTFOLIO DIVERSIFICATION

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Working Paper No. 1-78

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This paper will first review the academic literature relating to the advantages of portfolio diversification, especially in an international setting. It will then summarize the limitations of this literature and the implications for international diversification. Finally, the paper will discuss briefly a relatively new source of data which may provide additional insights into the long-term trend in exchange rates, which of course plays an important role in determining the desirability of acquiring long-term assets in foreign countries.

As we shall indicate below, current capital asset theory implies that portfolio diversification, whether at the national or international level, will increase return for given risk or reduce risk for given return. However, some basic assumptions which are made in the derivation of this theory (e.g., each investor has homogeneous expectations as to return and risk), and some consequences which flow from this theory (e.g., each investor holds a pro-rata share of the same portfolio), are known to be incorrect.

It is of interest, therefore, to note that a recent study of the U.S. stock market[1] presents data on the relationship between realized returns and diversification in the actual stock portfolios held by a large random sample of individual investors in two different periods. The results show fairly dramatically the importance of diversification in the reduction of risk.

During the period from July 1971 through June 1972 when the return on

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[1] Marshall Blume and Irwin Friend, The Individual Investor and the Stock Market, Twentieth Century Fund, forthcoming.

New York Stock Exchange stocks averaged 4%, 66% of the households whose port-folios contained only one dividend paying security experienced a loss on their dividend-paying NYSE stocks, compared to only 31% for those households holding more than 20 dividend-paying securities. Moreover, there was a steady decrease in the percentage of portfolios which showed a loss as the number of securities held increased. Corresponding data for 1970 exhibited a similar relationship between the dispersion of return and the diversification of stock portfolios. In both of these years, though the mean returns did not vary substantially with the number of securities held, household with undiversified portfolios experienced not only a much greater variability in return but also a much greater probability of realizing a less than average return.

The same study, using a number of different measures of diversification, points to a surprising lack of diversification in the stock portfolios of a high proportion of U.S. households. Referring to the simplest of the measures of diversification used in that study, viz. , the number of stocks held in a portfolio, 34% of stockowning households owned only one stock, 17% owned two and 38% owned three to nine, accounting respectively for 9%, 10% and 38% of the market value of outstanding stock held by U.S. households.

Using a somewhat more satisfactory measure of diversification (the reciprocal of the sum of squares of the proportions of the portfolio invested in each stock held), the effective level of diversification was found to be much lower than that implied by the number of stocks held. Thus, 70% of the portfolios had an effective level of diversification less than that obtainable from an equally weighted portfolio of two securities. Even for portfolios with 20 or more stocks, one-fourth showed a level of diversification obtainable from an equally weighted portfolio of seven or fewer securities.

While information is not available on the extent to which these U.S.

portfolios or portfolios in other countries are internationally diversified, it is obvious that diversification of stock investment across countries would also be extremely limited and at least for U.S. investors would be more limited, and thus even more undiversified, than suggested by the figures referred to above. Thus, it is useful to consider the potential benefits of international diversification that have been suggested in earlier studies which assume the validity of current capital asset theory and the integration of international capital markets. The potential benefits would be expected to be greater for investors outside than for those inside the U.S. because, at least for stock, the U.S. market portfolio has been estimated to represent 70-75% of the value of the world market portfolio.

Advantages of International Portfolio Diversification: Earlier Studies

The objective of international portfolio diversification is to eliminate unsystematic risk where unsystematic risk is defined as that risk which can be eliminated by the appropriate diversification of assets. Ideally, according to capital asset pricing theory, in a world not characterized by imperfections it would be sufficient to make proportionate investments in the world market portfolio to achieve such an elimination of unsystematic risk. In the real world, where transaction costs, imperfect information and capital controls do exist, it would be virtually impossible to acquire every security proportionately to its market value and thus own a pro rata share of the world market portfolio. However, we can more easily acquire a reasonable substitute for the world market portfolio in the U.S. market, which represents a preponderant portion of the world market portfolio and, consequently, which does not carry an important part of risk that is unsystematic and therefore diversifiable world-wide.

An empirical study by Lessard in [1] suggests the following percentages for the ratio of unsystematic risk to total risk in the different national market portfolios:[1]

Country	United States (US)	Nor- way (N)	Bel- gium (B)	Ger- many (G)	United Kingdom (UK)	France (F)	Italy (I)
Proportion of unsystematic risk	12	54	74	78	83	90	94

We emphasize that these statistics assume that domestic diversification is already complete. It means therefore that French investors could eliminate, in theory, as much as 90% of the risk of their domestic portfolio by inter-national diversification but that, in contrast, world-wide diversification would allow only a 12% percent reduction in risk for Americans with fully domestically diversified holdings. According to capital asset pricing theory, such a reduction in unsystematic risk should not be paid off by any sacrifice in terms of return, since the market is assumed in such theory to value only the systematic or non-diversifiable part of the total risk of an asset.

This same point is pursued further by Lessard who computes the betas of the different national portfolios with the world market and then, on the basis of a world security market line, estimates the difference in expected return per year between each national market portfolio and a portfolio of the same variability but fully diversified internationally. This difference in expected return provides us with another tentative measure of the losses due to incomplete diversification:

Country	U.S.	N	B	U.K.	G	F	I
Beta of national portfolio	1.1	.94	.55	.61	.86	.5	.5
Loss in expected return	.31	1.8	2.1	3.3	3.9	4.5	6.1

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[1] Each of these percentages represents the ratio of the variance of residual error to the variance of total return in a linear relationship between return in that country to return from all countries combined over the period January, 1959 –October, 1973.

As a last illustration of the potential benefits of international diversification, mention might be made of another empirical study, by Levy and Sarnat in [2], indicating for different market groupings the extent to which such diversification permits the reduction of risk while maintaining the expected return:[1]

Standard Deviations of Efficient Portfolios for Selected Rates of Return

(Percentage Return Per Annum)

Expected Rate of Return	10	15
Investment limited to:		
Developing countries	19	34
Common Market	15	25
Western Europe	12	19
High income countries	10	18
All countries	7	13

These results tend to reinforce the earlier evidence that for investors generally diversification outside their national boundaries would probably prove profitable for reducing risk, with the degree of benefit varying among different markets.

So far we have followed the traditional but misleading practice of converting returns in terms of U.S. dollars. It is a misleading practice because of the existence of exchange risk, which makes the sure claim to a dollar risky in terms of Liras, Marks or Francs. The difficulty here is compounded by the fact that, in terms of consumption, even a sure claim to one unit of local currency

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[1]The period covered in this analysis is 1951-1973.

will not be without risk to an investor in that country in view of the uncertainty in commodity prices. Here, we will ignore this last problem and concentrate on reviewing some of the descriptive data on exchange risk.

To indicate the importance of exchange risk for some major currencies, we present for the period 1971-74 the coefficients of variation (ratio of standard deviation to the expected value) of monthly exchange rates in terms of the U.S. dollar:

Country	:	G	N	F	B	I	UK
Coefficient of variation	:	.13	.11	.09	.07	.05	.04

(Source: Don S. Gull in [3])

These results, which seem to indicate that the Deutch Mark was the riskiest of these currencies for this period, must be qualified since they reflect only the ex-post variability of the exchange rates. In fact, we cannot even assume that, ex ante, investors form systematically unbiased judgments about the future behavior of currencies.

There is, however, a market variable that provides investors with some ex ante information as to future exchange rates. Unfortunately, empirical evidence would tend to show that, in the past few years at least, this market variable, the forward rate, did not fare too well as a predictor of future spot rates. Thus, the next table presents, in percent per annum, the mean relative rate of divergence between the future spot rate and the current forward rate during the years 1971-75 for various pairs of currencies:[1]

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[1]These rates of divergence are based on monthly data annualized.

Other currency:	U.S.$	U.K.Pound	Deutch Mark	French Franc	Belgian Franc
Numeraire					
U.S. $		2.8	9.8	7.6	9.6
U.K.Pound	-2.3		7.0	4.8	6.8
Deutch Mark	-8.4	-6.1		-1.9	-6.1
French Franc	-6.4	-4.0	2.4		-4.0
Belgian Franc	-8.5	-6.2	.1	-1.2	

(Source: Roll & Solnik in [4])

We see that, during this period, a U.S. investor taking a long position in Deutch Marks would have obtained a return of almost ten percent in excess of the return on a hedged position. Conversely, we can observe that, for transactions between France and Germany and, to a lesser degree, between the U.S. and the U.K., the exchange risk appears relatively low, due to the good informational content of the forward rate.

We now briefly look at the historical record of the different European stock markets in comparison with the U.S. market. Thus, for the period 1951-1973, the mean annual percentage rate of return and standard deviation of the market portfolios of the different countries were:

Country	:	G	N	F	U.S.	I	U.K.	B
Mean rate of return[1]	:	17	10.5	10.3	10.2	9.0	8.2	6.2
Standard deviation	:	25	18	20	12	21	16	14

(Source: Levy & Sarnat in [2])

[1] Does not include dividend yield.

As a point of reference, let us note that it seemed to be possible to construct a fully diversified portfolio yielding 10% as an average return for this period, at the price of a standard deviation of 7%. Thus we apparently find here

again the potential benefit of international diversification which could have provided French investors with a 65% decrease in risk and even U.S. investors with more than a 40% decrease in risk (as measured by the standard deviation of returns) without any statistically significant change in expected return.

We can now turn our attention to the returns of the different market portfolios in terms of their own respective currencies. Here, the corresponding risk measures are not readily available. Since these data do not incorporate either continuous exchange rate adjustments or currency devaluations, comparisons between countries may be illusory. We will just note that, during the period March 1966 - March 1971, which is a subset of the longer period covered in the immediately preceding table, Netherlands displaces Germany as the country with the largest mean annual return and Italy and the U.S. have much lower returns:

Country	N	G	F	UK	B	U.S.	I
Mean annual rate of return (%)	9.9	9.1	7.8	7.0	7.0	3.4	1.6

(Source: Roll & Solnik in [4])

It will be recalled that as compared to the preceding table not only is the period different but return is measured in the country's own currency rather than in U.S. dollars, and it is not possible to make return to risk comparisons. The poor mean return of the U.S. and Italian stock markets that this table reflects may, moreover, well be of a transitory or ephemeral nature. In the 1971-1976 period, the mean annual rate of price appreciation in the U.S. stock market was generally higher than in the other countries, though the Italian market continued to show the lowest returns.[1]

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[1]Estimates were derived from International Financial Statistics.

Limitations of Capital Asset Pricing Theory

for Assessing Advantages of International Diversification

The preceding review of the literature suggests that international portfolio diversification, which requires relatively heavy investment in the U.S. market, would yield substantial benefits to most investors. There are, however, significant deficiencies in the assumptions required to estimate the size of these benefits. We plan to consider here the more important of these deficiencies and their likely impact on the size of benefits which can be achieved.

First, the capital asset pricing model (CAPM) typically used to estimate the advantages of international diversification implicitly assumes that expected or required returns on a risky asset depends on the undiversifiable risk of that asset which in turn is related to the covariance of return on that asset with the return on the market as a whole and is measured by the asset's beta coefficient. However, recent studies devoted to explaining the returns on risky assets within the U.S. indicate that other factors besides the beta coefficient of an asset may affect its return fully as much as its beta does--and in particular those factors which are usually subsumed in the terms "residual" or "unique" risk or that part of the variation in return of the asset not explained by beta.[1]

If the residual standard deviation (or variance) of return is a significant factor in determining the rates of return at the level of a national market, it is likely to be even more important at the international level. The reasons why residual risk may affect asset returns at the national level--including

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[1] Irwin Friend, Michael Granito and Randolph Westerfield, "New Evidence on the Capital Asset Pricing Model," forthcoming in the Journal of Finance, and Haim Levy, "Equilibrium in an Imperfect Market: A Constraint on the Number of Securities in the Portfolio," forthcoming in the American Economic Review.

information and other transaction costs and possible investor irrationalities--
would appear to be even more cogent at the international level. Moreover,
political uncertainties might be expected to affect the relative valuation
of different assets much more strongly among countries than within a country.
Such political uncertainties might vary substantially over time and could
hardly be diversified away effectively. As a result of these non-beta, not fully
diversifiable factors affecting asset returns, it seems probable that the CAPM
overstates the advantages of international diversification in general.

On the basis of a priori considerations, it would be expected that the
usefulness of diversification in U.S. stock for investors in other countries
would be less overstated than the advantages of diversification in the stock
of most other countries for investors in the U.S. The reason for this expecta-
tion is that the U.S. market is characterized by relatively low information
and transaction costs to investors and is less subject to major political
uncertainties than other countries generally. However, it has not been
possible to check this expectation adequately against the empirical studies
which have analyzed the relative importance of residual risk in explaining
returns on risky assets within different national markets.[1]

A second reason why the CAPM may overstate the advantages of international
diversification is that this model assumes homogeneous expectations--i.e., all
investors are assumed to have the same subjective probability-distribution
of returns for the same asset. This assumption is deficient as a description
of the real world even within the same national market, but is likely to be

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[1] Pogue and Solnik[5] found that for the period March 1966-March 1971 residual
risk is relatively more important in the U.S. market than for most West European
countries, but this result is probably biased in this direction by their
sampling procedures which compare a mainly random sample of New York Stock
Exchange stocks (50 out of 65) with the largest stocks in European countries.
Moreover, no adjustment seems to be introduced to correct for measurement
error. In two more detailed analyses, it was found that residual risk is much
more important in Canada [6] and in Greece [7] than in the U.S.

even more questionable across markets of different countries. Generally
investors in one country are likely to be more optimistic than investors in
other countries about the riskiness of investment in the assets of their own
country. However, in view of the relatively high quality of information
readily available in the U.S. market, investments in that market may be
somewhat less subject to this problem than investments in the assets of other
countries.

Other significant types of risk which have not been satisfactorily handled
in the literature dealing with the advantages of international diversification
are exchange rate risk and commodity price risk. The inflation risk problem
could be handled using procedures developed by the authors together with a
colleague [8] in connection with an application to the U.S. market. The
exchange risk problem is likely to be more important and could be covered
by converting returns in each national market successively into returns of a
number of different currencies instead of into returns based on the customary
U.S. dollars alone. A paper by Marshall Blume for this Conference presents
simulated investment results showing not only the sensitivity of the advant-
ages of diversification between one country and another to the correlation
between the rates of return of the two countries but also to the exchange
risk so that a combination of moderately correlated returns and moderate exchange
risk largely eliminates the advantages of diversification between the two countries.[1]

Another problem that should be mentioned in connection with the usual
application of the CAPM to international markets is the implicit assumption
of the stability of beta coefficients. Within the U.S., the beta coefficient
is quite stable over any two successive five year periods for portfolios of
stocks classified by beta in either of the two periods [9]. The evidence

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[1]Marshall Blume, "Pension Funds and the Use of International Markets."

we have seen suggests this is not generally true within other national markets
[6], [7], [10] , and [11] .[1]

One last problem which has virtually been ignored in this literature
quantifying the advantages of international diversification concerns the
differentials in taxation applicable to the same assets in different countries
as well as to different assets in the same country.[2] Even in the application
of the CAPM within a country, it is incorrect to make the assumption, which
has generally been made, that the tax rate is identical on different assets.[3]
The assumption that differential taxes on assets across countries can be
ignored is much more dubious though it is not possible without a major
research undertaking to estimate the effect of correcting for this assumption
on the desirable level of international diversification.

As a consequence of these as yet unresolved problems, it is far from
clear that there are any significant advantages to the U.S. investor in
widespread international diversification, and it has yet to be demonstrated
convincingly that there are significant advantages for investors in most other
countries in such diversification. However, for this latter group we suspect
that these advantages do exist.

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[1]Pogue and Solnik [5] found little difference between the U.S. and European
markets as a whole in the stability of beta for individual issues. However,
as noted earlier the sample they used may be biased against the U.S. market
and they do not adjust for measurement error. More important more detailed
analyses for the U.S. [9] , Canada [6], Greece[7], the United Kingdom [10],
and Germany [11], seem to indicate less stable betas in other countries than
in the U.S. both for individual issues and portfolios.

[2]To our knowledge, the only attempt to deal with this issue is a theoretical paper
by Fisher Black "International Capital Market-Equilibrium with Investment Barriers"
Journal of Financial Economics 1, 1976.

[3]As a result of the higher effective tax rates on income for risk-free investments
than from risky investments, about all U.S. empirical studies of Sharpe-Litner
theory considerably understate the expected value of the risk-free rate implied
by tests of that theory. (Friend, Granito and Westerfield, op. cit.).

New Source of Data on Long-Term Trend in Exchange Rates

In view of the importance of exchange risk in assessing the desirability
of international investment and the apparently poor performance of forward
exchange rates in predicting future spot rates over even relatively short periods,
it may be useful to point out that a relatively new source of data may provide
additional insights into the future trend of exchange rates, though these
insights are likely to be more relevant to long-term than to short-term trends.
These data consist of purchasing power parity estimates (i.e, market value of
a currency divided by its purchasing power value) by Kravis and his associates[1]
for a large number of different countries, including all major Western nations
for several periods starting in 1950.[1] The data so far publicly available for
any extended time period cover only six countries (Kravis and Lipsey in [12])
for the period 1950-74, with purchasing power parity estimates based on gross
domestic product price indexes for all of the years covered but also based on
traded goods price indexes for 1970. The purchasing power parity estimates,
calculated with the U.S. as the base country and with weights derived from the
product composition of the respective countries covered, are presented below.

The estimates, which will be available shortly for many other countries
(16 in all) over the same period and based on traded goods price indexes for
1973 as well as 1970, raise serious questions about the validity of the purchasing
power parity theory which in its strongest form stipulates that, if we abstract
from transportation costs, the price of any commodity is the same anywhere,
independently of the country where it is sold or purchased, provided we use
always the same currency (usually the U.S. dollar) as a numeraire. Thus, the

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[1] This is currently being carried out under the sponsorship of the United Nations
and the World Bank.

PURCHASING POWER PARITY ESTIMATES

1950-1974

Country	GDP Price Index					Traded Goods Price Index	Non-Traded Goods Price Index
	50	60	70	73	74*	70	70
Germany	65	68	82	116	119	83	51
Italy	63	64	74	87	86	94	54
United Kingdom	65	75	73	84	84	86	59
France	73	78	80	101	98	93	66
Japan	NA	54	67	94	97	83	51

Base Country: U.S. = 100.

Weights: Own weights of respective countries.

Source: Kravis and Lipsey [12] .

* : Data for 1974 were extrapolated by means of regression analysis.

data strongly suggest that in the fifties and sixties prices were much higher

in the U.S. than in European countries or Japan which, said differently, means

that in the foreign exchange markets the dollar in this period was overvalued,

vis-a-vis its purchasing power, relative to these other currencies. However,

the data also point to at least some long-run tendency for departures from

purchasing power parity to be corrected.

It is of interest therefore to note that preliminary estimates of purchasing

power parity for 1974 based on traded goods prices suggest that as of that year

the currencies not only of Germany but also, though to a much lesser extent, France,

Japan and Italy were overvalued in the foreign exchange markets relative to the

U.S. dollar.[1] The overvaluation of the Deutch Mark compared to the U.S. dollar

may have been as high as 40%. There does not seem to be much evidence that the

apparent substantial 1974 overvaluation of the Deutch Mark has been corrected since

that time though much of the overvaluation of the French Franc, the Japanese yen

and the Italian lira may have disappeared.[2] Presumably the main reason for the

apparent undervaluation of the U.S. dollar in relation to the Deutch Mark and

to a lesser extent in relation to some of the other Western European currencies

is the size of the recent U.S. trade deficit and the concern that the international

flow of funds into short-term U.S. liabilities and long-term U.S. investments

which has helped to offset the trade deficit might be reduced or even reversed.

However, it would appear to us that investors with a long-run horizon might reason-

ably expect that the present undervaluation of the U.S. dollar in purchasing power

terms will eventually be corrected and we suspect that this is more likely to occur

through an upward movement in the market value of the U.S. dollar than in a greater

inflation of commodity prices in the U.S. than in the other countries. The emphasis

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[1] These estimates were obtained by using the 1970-1974 trend in purchasing power
parity estimates based on GDP price indexes to extrapolate the 1970 purchasing
power parity based on traded goods price indexes (see preceding table).

[2] From 1974 to 1977 a very much undoing of the undervaluation ...

of course is on the long-run horizon. In the shorter-run, the large U.S. trade deficit is not likely to be corrected in the near future and the more positive elements in the U.S. balance of payments may not improve sufficiently rapidly to preclude further pressure on the U.S. dollar.

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