INTERNATIONAL DIVERSIFICATION AND THE MULTINATIONAL
CORPORATION: AN INVESTIGATION OF PRICE BEHAVIOR
OF THE SHARES OF U.S. BASED MULTINATIONAL
CORPORATIONS ON THE N.Y.S.E.

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I.   Introduction:

Many of the shares traded on the NYSE reflect claims on profits

generated outside the U.S.   These profits are generated in part by ex-

porting and licensing but primarily through the operation of foreign

joint ventures and wholly-owned subsidiaries of American-based corpora-

tions.   It is generally acknowledged that in order to justify this global

reach, the multinational corporation (MNC) must have some advantage

relative to foreign single country firms which allows it to compete

effectively since multinational operations involve costs not borne by

local firms.   Following the lead of Hymer [6], economists have argued

that the primary reasons for foreign direct investment (FDI) are imper-

fections in product and factor markets (other than capital) which allow

firms to capture monopoly rents.[1]   This note seeks to determine whether

international diversification confers financial benefits and thus repre-

sent an additional rationale for FDI.

Potential financial advantages to multinational operations -- in

particular a potential reduction of risk through geographical diversifi-

cation -- have received relatively little attention in the theory of FDI

although they play a key role in the theory of foreign portfolio invest-

ment (FPI).[2]   A reason for this lack of emphasis may be the implicit

belief that international capital markets are efficient.   In such a market,

as has been shown in the literature on domestic capital markets, diversi-

fication at the corporate level will be of no benefit since investors

can diversify as well at the portfolio level.[3]   However, this presupposes

an international market in which an individual investor by himself or

through a mutual fund can obtain broad international diversification as

efficiently as a direct corporate investor.

Available evidence suggests that neither individual nor mutual funds are broadly diversified internationally, presumably at least in part due to institutional barriers to foreign investment. Thus, the geographical diversification of the MNC may represent a "service" which the ultimate investor cannot replicate. Most of the U.S.-based MNC's are large, publicly-held corporations and have a widespread ownership of their common stocks. Given the generally less efficient and less accessible capital markets of countries other than the U.S. or the U.K. and restrictions of capital movements which were common throughout the period of the most rapid expansion of MNC's, it is conceivable that these corporations were major suppliers of international diversification to U.S. investors.

Of course, the two types of advantages -- real market advantages and imperfections which increase returns and financial diversification services which may reduce risk for the investors, are not mutually exclusive. Further, to determine which one has greater strength appears to be an impossible task since both may predict similar behavior. For example, the relative preponderance of direct foreign investment out of the U.S. and portfolio flows into the U.S. has been explained by an elaborate chain of goods and factor market relationships -- the product life cycle model[4]-- but the same pattern is consistent with the result of efforts by U.S. and foreign investors to diversify their respective portfolios; non-U.S. investors will find it efficient to achieve international diversification through portfolio investment in the U.S. while U.S. investors will do the same by utilizing the "services" of the American-based MNC.[5] The different individual investment strategies reflect the assumed

differences in the degree of imperfection in U.S. and non-U.S. capital markets.

However, the proposition that investors value the geographical diversification of the MNC can be tested indirectly by posing the question whether investors recognize the international involvement of U.S.-based MNC's, and whether the price movements of the shares of such international corporations is related to their degree of international involvement. A negative finding would eliminate diversification benefits as an advantage to multinational diversification.

II. <u>Does International Diversification Confer "Benefits" -- An Indirect</u>

   <u>Test</u>

An investigation of the behavior of the prices of the shares of

American-based MNC's should shed some light on the extent that the market

recognizes the international nature of these firms. Since the shares of

American-based MNC's represent claims on foreign as well as domestic

activities one would expect share price movements to reflect this fact.

If prices behave as if the market does not distinguish between firms with

different degrees of international involvement, one would have to conclude

that as far as the American equity market is concerned, international

diversification of activities does not matter. On the other hand, if

the movements of share prices indicate that the market perceives inter-

national corporations as different than those less internationally

inclined, this evidence will suggest that theories which emphasize the

importance of international diversification should not be rejected out

of hand.[6]

A recognition by the market of the extent of international diversi-

fication of particular corporations does not in itself imply that the

shares of these corporations are "better" than those of less interna-

tional corporations. Rather, it only points out that these firms supply

the market with "ready-made" international diversification, and that the

market recognizes this fact.

III. The Relationship Between Share-Price Behavior and the Extent of
      International Involvement:

Fluctuations in share prices reflect events (i.e., new information)
which change the future cash flows of corporations or the mechanism by
which these future flows are capitalized by investors in the market.

For purposes of exposition, it is useful to classify fluctuations
within a single economy as those resulting from three arbitrarily defined
types of effects -- those that affect virtually all stocks (although
perhaps to a different degree), those that affect certain groups of
stocks such as industries, and those specific to single stocks. The
first type of effect, which empirically accounts for about a third of
the variance of price changes for the average stock, is the main com-
ponent of the systematic risk which cannot be eliminated by diversifi-
cation.[7] Further, the relationships between securities can be described
quite completely in terms of diagonal correlation of covariance matrix,
i.e., one in which all relationships between securities except those with
the "market-factor" (the factor which affects all securities), are
ignored. Following the lead of Markowitz [12] and Sharpe [13], this
model of the interdependence of changes in security prices is known as
the market model. The market model is presented by the following
relationship:

$$\tilde{R}_{jt} = \alpha_j + \beta_j \tilde{R}_{Mt} + \tilde{\epsilon}_{jt} \tag{1}$$

where $\tilde{R}_{jt}$ is the return on security j (a random variable) in period t.
$\tilde{R}_{mt}$ is the return on the market index, α_j and β_j are parameters for

security j, and $\tilde{\varepsilon}_{jt}$ is a random variable with a zero mean, and
Cov $(\tilde{\varepsilon}_i, \tilde{\varepsilon}_j) = 0$, Cov $(\tilde{R}_j, \tilde{\varepsilon}_j) = 0$.

Internationally, the structure of returns appears to be more complex. Each domestic market appears to be reasonably well described by the market model, but the market factors of various countries are related through a world factor.[8] In this case the interdependence of changes in the prices of securities in the international market can be posited as:

$$\tilde{R}_{jk} = \alpha_j + \beta_{jk}\tilde{R}_k + \gamma_j\tilde{R}_w + \tilde{\varepsilon}_j \qquad (2)$$

where $\tilde{R}_{jk}$ is the return on security j from country k, and where time subscripts were dropped for simplicity. $\tilde{R}_w$ is the return on the world market excluding country k, and $\tilde{R}_k$ is the return on the country k market factor.

If we view an international firm as a collection of activities in different countries, then the return on its traded share can be described as:

$$\tilde{R}_j = \alpha_j + \sum_{i=1}^{N} \beta_{ji}\tilde{R}_i + \gamma_j\tilde{R}_w + \tilde{\varepsilon}_j \qquad (3)$$

where $\tilde{R}_i$ represents the orthogonal component in the return on each of the country factors in which firm j has an operation. Equation (3) implies a direct relationship between the international composition of the firm's activities and the time pattern of the price changes of its shares. Unfortunately such a complex relationship would be difficult to test due to the lack of necessary data, and the need for a more specific and explicit international valuation model.

In this paper we are aiming at a more modest and preliminary step. In particular we test the proposition that securities of firms with relatively large international operations are more closely related to the rest of the world market factor and less to their home country factor than stock of firms which are essentially domestic. We expect this since non-U.S. activities should be reflected by a dependence on the rest of the world factor and the appropriate country factors, but not by dependence on the U.S. country factor. Therefore, the higher the proportion of non-U.S. activities, the lower the dependence on the U.S. country factor. Further, since the rest of the world factor by construction does not reflect U.S. activities, it should become more important as non-U.S. activities increase. Thus an examination of the relationship between security price changes and the domestic and the rest of the world factors, controlling for the degree of international involvement, provides a partial and indirect test of whether the international composition of a firm's operations is reflected in the market behavior of its securities.[9]

Explicitly we posit the following relationship:

$$\tilde{R}_{js} = \alpha_j + \beta_{js}\tilde{R}_{us} + \gamma_{js}\tilde{R}_w + \tilde{\epsilon}_j \qquad (4)$$

where $\tilde{R}_{js}$ = return on the share of the jth corporation with a proportion s of non-U.S. sales, $\tilde{R}_{us}$ the return of the NYSE index, and $\tilde{R}_w$ the return of the rest of the world index ($\tilde{R}_w$ is orthogonal to $\tilde{R}_{us}$ by construction).

We test the hypothesis that β_{js} is a decreasing function of s, and that γ_{js} is an increasing function of s. In other words:

$$H_1: \quad \frac{\delta\beta_{js}}{\delta_s} < 0 \quad ; \quad \frac{\delta\gamma_{js}}{\delta_s} > 0$$

H_0: β_{js} and γ_{js} are independent of s.

IV. Empirical Results:

In order to test the hypothesis that security returns reflect the international composition of a firm's activities, monthly returns (changes in stock price plus cash dividend, divided by the previous price) and an estimate of the proportion of a firm's revenue from non-U.S. sources were obtained for a sample of 217 U.S. firms.[10] The firms were then ranked according to the degree of international activity and grouped in deciles in order to reduce the influence of differences other than the extent of international activity. The composite return series for the resultant portfolios (about 20 stocks were included in each one) were regressed on the indices for the U.S. stock market and the rest of the world (i.e., world minus U.S. effect).[11] In order to avoid multicolinearity between the two indices the Capital International index was regressed on the NYSE index and the residuals of this regression were defined as the "rest of the world" stock market index.

The results of this regression are presented in Table 1 below:

<u>Table 1</u>

Summary Results of the Regression of the Monthly

Returns on U.S. Based International Corporations on the U.S.

and the World Index 1959-1972

(168 monthly observations)

$$R_{js} = \alpha_j + \beta_{js}\tilde{R}_{vs} + \gamma_{js}\tilde{R}_w + \tilde{\epsilon}_j$$

Portfolio #	Proportion of Sales Outside the U.S. (%)	β (U.S.)	Std.Er. of β	γ (World)	Std.Er. of γ	R^2 of Regression
1	1-7	1.04	.03	.16	.09	.898
2	7-10	1.06	.03	-.11	.10	.884
3	10-13	.98	.03	.13	.08	.894
4	13-17	.82	.03	.56	.08	.861
5	17-21	.98	.03	.18	.10	.866
6	21-25	.98	.03	.20	.10	.856
7	25-28	.82	.03	.50	.09	.853
8	29-35	.99	.03	.30	.10	.872
9	35-42	.86	.03	.59	.10	.820
10	43-62	.88	.03	.60	.09	.864

The data presented in Table 1 suggests that on the average the

larger is the international involvement, measured by proportion of sales

outside the U.S., the larger is the coefficient γ relating the changes

in the share price to the rest of the world index (not including the

U.S.). Moreover, the higher the level of international involvement, the

more statistically significant is the γ coefficient. In the same way,

the β coefficient relating the price change to the U.S. index declines

with the increase in the international involvement.[12] This evidence

supports the hypothesis that the market recognizes the geographically

diversified nature of the U.S.-based international corporations as well

as the extent of their international involvement.

These results, however, are only indicative since they do not show whether the observed differences in β's and γ's are statistically significant. Further, although the grouping of stocks into portfolios is useful for isolating the impact of the extent of international activity, it does not lend itself easily to such a test. Therefore, we performed a two-stage regression on individual stock data.

In the first stage, β_j and γ_j were determined for each of the 217 securities using equation (4). In the second stage the β_j's and γ_j's were related to IS, the international sales ratio, in two separate equations:

$$\beta_j = a_j + b_j IS + u_j \tag{5a}$$

$$\gamma_j = a'_j + b'_j IS + u'_j \tag{5b}$$

The evidence presented in Table 1 suggests that b_j will be negative and that b'_j will be positive. A summary of the two-stage regression is presented in Table 2 below.

Table 2

Summary Results of the Two-Stage Regression
(217 Securities, 168 Monthly Obs.)

	b_j(U.S.)	T stat.	F stat. (1,215)	DW(Adj.)
(a)	-.010	-3.98	15.91	2.17
	b'_j(W)	T stat.	F stat. (1.215)	DW(Adj.)
(b)	.012	4.42	19.52	2.24

Both b_j and b'_j have the expected sign and are statistically significant at a 5% level.

V.   Conclusions

The results reported above support the hypothesis that the market
(NYSE) behaves as if it recognizes the international composition of
the activities of U.S.-based corporations. This is, however, but a
first step towards a full specification of the relationship between real
corporate variables, such as the international distribution of operations,
and capital market variables such as changes in share prices. Based
on our evidence, the hypothesis that such a relationship exists cannot
be rejected.

FOOTNOTES

1. For example, see Kindleberger [8], Wells [17], Hufbauer [4], and Dunning [3].

2. The benefits of international diversification were introduced into the literature by Grubel [5]. Numerous studies have followed and those of Lessard [9] and Solnik [15] demonstrate that international diversification does result in a substantial reduction in risk.

3. Myers [12] provides the clearest exposition of this rationale.

4. This theory, or rather set of theories, was first developed by Vernon [16] and has been elaborated and tested repeatedly. Wells [17] provides an excellent summary.

5. Ragazzi [18] does consider this as one of several forces determining the observed investment pattern.

6. Cohen [2] has shown that the earnings of the various national components of MNC's show very low correlations and Lessard [9], Wolnik [15] and others have shown that changes in share prices, which reflect changes in the perceived value of future operations, of firms based in different countries provide substantial scope for risk reduction.

7. The Capital Asset Pricing Model of Sharpe [13] and Lintner [10] shows that only systematic risk is compensated, i.e. requires a risk premium. Therefore, a security's systematic risk determines the return investors demand for holding it.

   If some of the group (industry) elements affect a large proportion of all shares (in terms of capitalized value) they also will contribute to systematic risk, but to a lesser degree than the market risk which affects most securities.

8. Agmon [1], Lessard [9], and Solnik [14] explore the international structure of returns. All conclude that country elements are very strong and industry elements of little importance. However, they do not accept a common definition of the world market factor nor do they resolve whether price changes of individual stocks are directly related to the world factor or are related only indirectly through the respective domestic market factors.

9. It should be emphasized that our analysis is restricted to determining the impact of degree of a firm's international involvement on the relationship of its stock's movements with general domestic and world market effects. It does not encompass tests of the relationship between the stock's riskiness and average return over time. The latter

question, a test of a particular capital asset pricing model, is substnatially more difficult both because of complex questions about the proper specification of such a relationship in a domestic context and the difficulties of extending it to an international context. For an excellent review of the first set of issues see Jensen [7], for the second Agmon [1] and Solnik [14].

10. The foreign activity measures, proportion of sales generated outside of the U.S. were taken from Standard and Poor's, The Outlook (August 13, 1973). The ideal measure of foreign activity would be proportion of total market value represented by non-U.S. operations, sales, etc. However, for obvious reasons this number is not available -- nor is it known by the firms in question. Other measures such as assets, employees, or revenues appear to be even further from the ideal than sales. The international distribution of revenues, for example, is arbitrary since it depends on transfer prices, overhead allocations, and various accounting conventions regarding recognition of foreign activities. However, the grouping procedure employed should alleviate this problem.

11. The New York Stock Exchange index was used for the U.S.; the Capital International index, a capitalization weighted index of all major market, was used for the world.

12. The same relationships remain when the 14 year period was split into two seven-year periods.

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