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WHY INVESTORS VALUE MULTINATIONALITY

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ABSTRACT

This paper examines the value of multinationality to investors, as measured by its effect on firms' Q ratios. We find that the positive impact of expenditures for research and development and for advertising on a firm's Q is enhanced by multinationality, but that multinationality itself does not have any significant impact. Our result supports the internalization theory which holds that intangible assets are necessary for direct foreign investment to make sense. It thus lends support to a recent strand of trade literature which assumes that multinational firms have intangible assets with a public goods property. Our results do not support the hypothesis that investors value multinational firms as a means of diversifying their portfolios internationally.

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WHY INVESTORS VALUE MULTINATIONALITY

I. INTRODUCTION

A substantial portion of business activity is conducted by multinational firms. Yet relatively little is known about the value of multinationality to investors or even if multinationality does in fact add to share value. In this paper, various theories linking multinationality to investment value are examined empirically. We begin by outlining the basic ideas behind each.

1. *The Internalization Theory*[1] posits that direct foreign investment occurs when a firm can increase its value by internalizing markets for certain of its intangible assets. Such assets might include superior production skills, patents, marketing abilities, managerial skills, or consumer goodwill. These intangible assets have some characteristics of public goods in that their value is enhanced in direct proportion to the scale of the firm's markets. They are also based largely on proprietary information and thus can not be exchanged at arms length for a variety of reasons arising from the economics of information as well as from their public good properties[2]. A firm can by-pass these transactions difficulties by internalizing the markets for such assets. It can enhance its value by expanding abroad and controlling foreign operations itself if the expected gains from applying the intangibles in a foreign market are sufficient to compensate for the higher costs of operating a foreign subsidiary. Direct foreign investment thus takes place. The implication is,

therefore, that multinational firms are firms possessing useful intangible assets, the value of which is proportional to the firms' degree of multinationality[3].

2.   *Imperfect World Capital Markets* is the assumption underlying the second theory we examine.[4] Because of institutional constraints on international capital flows, information asymmetries, or other reasons; investors are prevented from optimally diversifying their portfolios internationally in a direct manner.   Multinational firms offer shareholders international diversification opportunities via their direct investments abroad.   This is thought to enhance their share prices at home relative to those of uninational firms.

3.   *Managerial Objectives* may differ from share price maximization, and this is the basis of the third theory we examine.   There is a large literature in finance[5] arguing that the more complex the corporation's environment, the more difficult it is for shareholders to monitor management's decisions.   This leaves the managers of such firms more freedom to act in their own self-interest at the expense of shareholders.   This divergence of interests would tend *ceteris paribus* to reduce the values of multinationals relative to uninationals since the formers' environments are arguably uniformly more complex.

4.   We also comment briefly on the popular views that multinationality raises the value of a firm because it allows the firm more possibilities for tax avoidance and/or access to relatively low cost inputs from abroad, especially from less developed countries.

Briefly, our results are that there is strong evidence in favor of the internalization theory and little or no support for the alternatives listed above. We find that the degree of multinationality of a firm is positively correlated with market value as measured by Tobin's q[6]. This suggests that the divergence of interests problems of multinationals do not dominate other factors which distinguish them. We further find that this positive correlation is dependant upon the extent of a firm's research and development or advertising spending. Alternatively, the impact of spending on these intangibles increases with the extent of a firm's multinationality. International diversification *per se* is not particularly valued by investors in the absence of these indicators of investment in intangibles. This should not be the case if the value of multinationality were due to diversification, tax advantages, or lower production costs. It is, however, entirely consistent with the internalization theory. Our results appear to be quite robust.

II. REVIEW OF THE LITERATURE

Our results are consistent with a number of earlier empirical studies of multinationals. Vaupel (1971), Vernon (1971), and Dunning (1973) find in simple descriptive studies that multinationals are larger, earn higher accounting profits, and spend more on R&D and advertising. Using regression analysis, Horst (1972a, b), Caves (1974), Dunning (1980), Buckley and Casson (1976, ch. 4), Wolf (1977) and Pugel (1978, Ch. 4) all find a positive relation between multinationality and proxies for

intangible assets like R&D expenditure, advertising, and the portion of scientists and engineers in total employment.

These earlier studies suffer from one critical problem: they rely on industry averages rather than individual firm data. Since the theoretical linkage between the possession of intangible assets and multinationality is based on a firm analysis, the last problem is especially critical.

The value of multinationality to shareholders is not directly examined in this earlier empirical literature. According to the internalization theory, a multinational firm has an advantage due to firm specific intangible assets which allow it to overcome the adversity of doing business in a foreign location. If these assets are indeed information based, like production skills, marketing skills, etc. then they behave like a public good in that their value increases as a firm becomes more multinational. Therefore equity value should, *ceteris paribus*, be positively correlated with degree of multinationality in the presence of such assets.

This is a basic assumption underlying recent theoretical international trade articles by Markusen (1984), Helpman (1984), Ethier (1986), and Horstmann and Markusen (1988). One purpose of this paper is to search for empirical evidence of such a relation.[7]

Empirical evidence for the imperfect world capital market theory is less than clear-cut. If barriers to international capital flows prevent investors from moving their savings between nations, multinationals could provide a substitute means of

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achieving an optimal level of international diversification. This could lead to higher share prices for multinationals.[8] Agmon and Lessard (1977) find that the rates of returns of firms with more sales generated outside the U.S. are less correlated with the U.S. market returns and are more correlated with foreign market returns. From this they conclude that investors recognize the international composition of the activities of U.S. corporations. Unfortunately, their study does not shed light on the actual value of multinationality to investors because it is based on return data. Indeed, Brewer (1981) presents evidence that multinational and uninational firms are on the same C.A.P.M. security line. Also, Jacquillat and Solnik (1978) present evidence that multinationals are not a good substitute for foreign stocks as a means of international diversification.

Adler (1981) discusses the difficulty in using return data to gauge investors' valuation of international diversification through multinational firms' direct foreign investment. Using an event study, Fatemi (1984) shows that the cumulative abnormal return of multinational firms around the date of international expansion is positive but is relatively small when compared with, say, a merger.[9] This result does not necessarily imply that there is value in international diversification at the firm level. For example, a compatible interpretation is that internationalization is a positive signal.

Errunza and Senbet (1981) find that 'excess value'[10] is significantly positively related to multinationality as measured by the fraction of sales due to foreign subsidiaries. Errunza and

Senbet (1984) confirm their earlier result using other measures of multinationality. A part of their latter result is puzzling: when multinationality is measured by the number of foreign subsidiaries a significant negative relation links 'excess value' and multinationality. Based on these results, they conclude that 'there is a valuation effect of international corporate diversification' and that 'costless international corporate intermediation through foreign direct investment restores perfect market type results by undoing barriers to international capital flows faced by investors'.[11] Kim and Lyn (1986) confirm the Errunza and Senbet (1981) study adding R&D and advertising spending as controls and find positive coefficients on these variables. These studies do not control for industry effects.

Doukas and Trawles (1988) use an event study methodology to show that when U.S. multinational firms make acquisitions in countries in which they have not previously been active, their shareholders gain.

However, foreign acquisitions, like other complex takeover events, have effects which are likely to depend on the detailed financial characteristics of both the target and bidder (see Lang *et al.* 1988, Morck *et al.* 1989). Since this information is not readily available for foreign targets, basing inferences about the issues raised above on event study results is somewhat problematic. We therefore employ a cross sectional approach despite the alternative set of difficulties it entails.

In summary, both event study and cross sectional study work suggest a link between multinationality and shareholder value.

There also appears to be a correlation between multinationality and intangible assets. In the next section we explore possible reasons for multinationality to affect share value, paying special attention to the role of intangibles.

III. METHODOLOGY AND DESCRIPTION OF THE DATA

The methodology used in this study builds from earlier studies of market valuation by Modiglianni and Miller (1958), Tobin and Brainard (1977), etc.. We begin with a basic assumption of financial market efficiency: namely that the market value of a firm (V) is the sum of the value of its net tangible assets (T) and its net intangible assets (I). Thus,

$$V = T + I \tag{1}$$

The market value of a firm[12] is defined as the market value of its outstanding common shares plus estimates of the market values of its preferred stock and its debt. The tangible assets[13] variable is an estimate of the market value of the firm's plant and equipment plus an estimate of the value of its inventory. We use 1978 data because information about the multinationality and financial characteristics of the firms in our sample is most complete for that year.[14]

We wish to understand whether multinationality should be considered as one of the intangible assets making up I in equation (1). If we are to test for this, we must control for other

obvious common intangible assets. The two most obvious candidates are a stock of technical expertise and a stock of consumer goodwill. Research and development spending (RD) is used as a proxy for technical expertise, and advertising expenditures (ADV) as a proxy for consumer goodwill.[15] A leverage variable (DEBT) is included to proxy for any variation in firm values due to differences in capital structure[16]. We also wish to control for intangible assets related to sheer size. Multinationals tend to be larger, so we must be careful to eliminate any effect due solely to firm size if we are to isolate the impact of multinationality on value. To proxy for the value of intangible assets related to size we therefore include the value of tangible assets T. Thus we postulate that

$$I = \beta_0 T + \beta_1 MN + \beta_2 RD + \beta_3 ADV + \beta_4 DEBT + \Upsilon \tag{2}$$

where MN is an as yet unidentified proxy for the dollar value of multinationality to the firm. The term Υ represents residual intangibles related to other factors. Substituting (2) into (1) and dividing through the entire equation by T yields a basic equation relating a firm's q to the various intangibles as functions of the proxies listed above:

$$q = \beta_0 + \beta_1 mn + \beta_2 rd + \beta_3 adv + \beta_4 debt + \upsilon \tag{3}$$

where q is the market value of the firm (V) divided by the replacement cost of its tangible assets (T), and where rd, adv,

and *debt* are equal to the corresponding variables in equation (2) per dollar of replacement cost of tangible assets[17]. The variable *mn* is now assumed to contain the effect of multinationality in terms of adding to market value per dollar of replacement cost of tangible assets. The effect of scaling by T is to control for firm size in all the variables and thus hopefully limit problems due to heteroskedasticity in the residual v.

In order to control for specific intangible assets related to certain lines of business, we also include a series of three digit Standard Industrial Classification (SIC) code industry dummies (d_l). For example, publishing firms might be expected to have substantially more intangible assets per dollar of physical assets than other firms. Because these SIC code dummies add up to a vector of ones, we drop the constant from our specification. Thus, the equation we employ in our regression analysis is:

$$q = \sum_{l=1}^{n} \gamma_l d_l + \beta_1 mn + \beta_2 rd + \beta_3 adv + \beta_4 debt + v \qquad (4)$$

Equation (4) says that a firm's value to shareholders as measured by q is a function of its industry (measured by the indicator dummies $\{d_l\}$), its research and development spending (rd), its advertising (adv), its leverage $(debt)$, and its degree of multinationality (mn).

We have included the variable *mn* in equation (4) without specifying how to construct a measure of multinationality that would capture the effects of foreign direct investment on q. We shall begin with two basic measures to use for *mn*: the number of

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foreign subsidiaries the firm has (*subs*) and the number of foreign nations in which it has subsidiaries (*nats*).[18] We shall also use a series of dummies to represent various levels of foreign direct investment as measures by *subs* and *nats*.

IV. EMPIRICAL RESULTS

Table I contains univariate statistics describing the variables in equation (4). The mean Tobin's q for the 1644 firms in our sample is .814. R&D spending and advertising expenditures both amount to a bit over 2% of the value of tangible assets. The average leverage is 28% of the value of tangible assets. The mean firm has about four foreign subsidiaries in two or three foreign countries, however the standard errors of these numbers are quite large. The number of foreign subsidiaries ranges from zero to 161, and the number of nations containing a firm's foreign subsidiaries ranges from 0 to 58. About 62% of the 1644 firms have no foreign subsidiaries, 12% have 5 to 19 subsidiaries, and 6% have 20 or more.

Tables II and III contain estimates for the parameters of equation (4) using different variables to measure *degree of multinationality*. Control variables to account for the effects of R&D spending, advertising, and leverage are also included. Dummies representing three digit SIC codes are included in the regression, however their coefficients are not shown in the tables.

Note that all three multinationality variables are positively correlated with higher firm value. In regression (2.1) the number

of foreign subsidiaries (*subs*) is substituted for *mn* as the measure of multinationality. In (2.2), an indicator dummy set to one if the firm has five or more foreign subsidiaries is used; and in (2.3) we employ an indicator dummy for twenty or more foreign subsidiaries. In each case the effect of multinationality is higher firm value. The effect in (2.1) and (2.2) is highly significant; in (2.3) it is significant at the 10% confidence level.

Regression (2.1) says that, on average, an additional foreign subsidiary increases market value by 0.331% of the value of tangible assets. Regression (2.2) says that a firm with five or more foreign subsidiaries, on average, has a q some 8.41% higher than that of a firm with less than five subsidiaries. Regression (2.3) says that the q of a firm with twenty or more foreign subsidiaries is likely to be about 10.6% higher than that of firms with less than twenty.

These findings are corroborated by table III where the number of nations in which the firm has foreign subsidiaries is used to construct *degree of multinationality* variables and where qualitatively similar results obtain.

This positive relationship between multinationality and firm value (as measured by q) could be due to several of the theories discussed above. Intangible benefits connected with the possession of firm specific assets as described in the internalization theory might be present. Diversification opportunities for shareholders who otherwise would not be able to invest abroad because of imperfect world capital markets would make the stock of

multinationals more valuable.[19] The value of multinationality may also stem from more access to tax avoidance methods or lower input costs.

At first glance, our results appear inconsistent with the managerial objectives theory which predicts that a complex multinational corporate structure might allow managers more opportunity to pursue their own self-interest at the expense of share value maximization. This theory would imply a negative effect of multinationality on share value. We shall return to this point.

In order to distinguish between the various theories which are consistent with the results in tables II and III, we refine the structure of our regression slightly. The internalization theory suggests that multinationality augments value because it lets a firm use intangible assets such as special know-how, management skills, patents, marketing ability, or consumer goodwill on a larger scale. It follows that if a firm lacks such intangibles, multinationality should be of little value. On the other hand, theories of multinationality having to do with diversification opportunities, tax avoidance, labor costs, etc. predict a value to multinationality regardless of whether or not such intangibles are present.

Our R&D variable is included to control for intangibles such as special know-how and patents. The advertising variable is included to account for intangibles related to marketing sophistication and consumer goodwill. The internalization theory predicts that the positive coefficient (β_1) on the degree of

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multinationality measure in equation (4) should be larger for firms whose R&D spending or advertising spending is larger. Therefore, we postulate that

$$\beta_1 = \alpha_0 + \alpha_1 rd + \alpha_2 adv \tag{5}$$

The public good property of the intangibles related to R&D and advertising should make them more valuable as the firm becomes more multinational. Thus, the internalization theory predicts that α_1 and/or α_2 should be positive, while α_0 should be zero. The imperfect capital markets theory, as well as theories based on taxes or input costs, implies that α_0 should be positive with α_1 and α_2 both zero. The managerial objectives theory is consistent with α_0 negative and both α_1 and α_2 zero. Substituting (5) into (4) yields a new regression containing cross products of the degree of multinationality with R&D spending and with advertising.

$$q = \sum_{i=1}^{n} \gamma_i d_i + \alpha_0 mn + \alpha_1 rd \cdot mn + \alpha_2 adv \cdot mn$$
$$+ \beta_2 rd + \beta_3 adv + \beta_4 debt + v \tag{6}$$

The parameters of equation (6) are estimated in tables IV and V for various *degree of multinationality* variables. In regression (4.1) of table IV, the number of foreign subsidiaries (*subs*) is substituted in for *mn*. Note that only α_2 is significant, indicating that multinationality has significant value only to firms with intangibles related to advertising. Regression (4.2) employs an indicator dummy set to one if the firm has five or more

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subsidiaries. Here multinationality has significant value only for firms with intangibles related to R&D. In regression (4.3), multinationality (meaning more than twenty foreign subsidiaries) again has value for firms with R&D related intangibles. Note however that the point extends for α_2 is quite large. Since R&D spending (rd) and advertising (adv) are significantly correlated ($\rho=.07$, confidence level$=.0069$), we are not justified in attaching importance to the significance of one verses the other in the various specification. The important point is that the two interaction variables in equation (6) have the right sign and at least one of them is significant. Moreover, F-statistics for the joint significance of α_1 and α_2 have probability values of less than 1% in all regressions except (5.1), where the value is less than 5%.

It is equally important that in all regressions in table IV α_0, which measures the direct effect of multinationality, is insignificant. Multinationality appears to have no significant value unless the firm possesses R&D or advertising related intangible assets. These results together provide a strong support for the *internalization theory*: the value of multinationality stems from the possession of intangible assets and that the value of these intangible assets increases with the degree of multinationality.

These results are corroborated by the estimates in table V where the number of nations in which the firm has subsidiaries is used to construct an analogous set of multinationality variables to those described in table IV. Again, multinationality has no

positive impact on firm value unless R&D spending or advertising is taking place. In (5.2) and (5.3) the size of the positive impact of multinationality is again proportional to R&D and/or advertising expenditures.

In addition to providing support for the *internalization theory* our results cast light on other issues. First, our results for α_o are inconsistent with the view that international diversification at the firm level leads to additional investment value. Our findings are consistent with the view of Adler and Dumas (1983) that multinationals' stock prices will not necessarily be bid up because these firms provide indirect international portfolio diversification, even if capital markets are segmented.

Second, our results are now not necessarily inconsistent with the *managerial objective theory*. Indeed, in regression (4.3) and (5.3) where α_0 comes closest to being significant, its sign is negative. Furthermore, α_0 is consistently negative when multinationality is proxied for using a dummy indicating a large number of subsidiaries or host countries. If multinationality in the absence of R&D or advertising related intangibles has a negative effect on firm value, this would indicate that the managerial objectives theory might be operational as well, but that it is swamped by the effects of the internalization theory in tables II and III.

Third, our results provide no support for theories of the advantages of multinationality based on tax avoidance through transfer pricing, etc., or on lower input costs abroad. Both of

these theories imply that the multinationality variables themselves and not their interactions with R&D or advertising should be positively related to firm value. This is not the case.

As further evidence, table VI presents a regression explaining q with the usual control variables and industry dummies, but with three multinationality measures: the number of subsidiaries in developed countries (dc), the number in less developed countries (ldc) and the number of subsidiaries in tax havens (th).[20] Thus the regression run is:

$$q = \sum_{i=1}^{n} \gamma_i d_i + \lambda_1 dc + \lambda_2 ldc + \lambda_3 th$$
$$+ \beta_2 rd + \beta_3 adv + \beta_4 debt + v \qquad (7)$$

where dc plus ldc plus th is equal to $subs$, the total number of foreign subsidiaries. Note that λ_1 is significant at the 10% level and positive, while λ_2 and λ_3 are both insignificant. This indicates that the value of multinationality derives from a presence in other advanced industrial economies, not from a presence in inexpensive labor or low cost countries. The tax haven variable is included separately because of the difficulty of classifying these countries as developed or less developed. A presence in a tax haven does not appear to contribute to shareholder wealth. Tax based theories of the advantage of multinationality do not necessarily require a presence in a tax haven. In alternative specifications (not shown) allowing interactions of R&D and advertising with dc, ldc, and th; only the interactions between dc and intangibles are marginally

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significant. The results for *dc*'s interactions are similar to those for *sub*'s interactions shown in table IV. Combining tax havens with either of the two main groups does not qualitatively change the results for either.

V. ROBUSTNESS OF THE RESULTS

There are a number of potential pitfalls in our methodology. For example, we may have omitted important variables in the specifications of our regression equations, leaving our multinationality measures to proxy for these left out variables.

We use R&D and advertising spending as proxies for intangible assets whose value might be enhanced by multinational expansion such as technical expertise and marketing sophistication. Other intangibles such as superior corporate organization, accumulated production skills, and especially management quality may also be relevant. Unfortunately it is difficult to come up with reasonable proxies for these assets. Growth rates are inappropriate in this capacity as a fixation on growth maximization rather than share price maximization is often regarded as a deviation from good management. Temporarily high earnings, profitability, or cash flow are also thought by some authors to be associated with the management pursuing goals other than share price maximization.

If our multinationality measures were proxying for such left out variables, we should expect to find a positive coefficient on α_0. This is not the case. Perhaps this is because the link between our multinationality variables and these missing factors

is too tenuous. It is, however, also plausible that R&D and advertising spending are as good proxies for managerial skills, etc. as any other possible choices[21], and are thus already capturing much of the effect of these left out variables.

In regressions of the type we are considering it is common to include a measure of firm size and of historical performance. The latter is often justified as a measure of "growth prospects". Since firm size and historical performance are likely correlated with multinationality, we now consider these variables. We include the value of tangible assets (T) as a measure of firm size and the growth rate of the firm's labor force over the previous three years $(grow)$ as a measure of growth. We thus regress

$$q = \sum_{i=1}^{n} \gamma_i d_i + \alpha_0 mn + \alpha_1 rd \cdot mn + \alpha_2 adv \cdot mn$$
$$+ \beta_2 rd + \beta_3 adv + \beta_4 debt + \beta_5 T + \beta_6 grow + \upsilon \qquad (8)$$

Note that including T in equation (8) implies a T^2 term in the initial specification. Thus we posit that multinationality may be proxying for non-linear effects in firm size. (Linear effects are already accounted for in the constant which is subsumed in the industry dummies.) Similarly, the growth rate must be seen as augmenting value per dollar of tangibles rather than value itself.

The estimated coefficients of equation (8) are shown in tables VII and VIII. Note that the multinationality measures and interactions are not materially affected. In fact none of the results in any of the tables shown is materially altered by the

presence of T and *grow*. Although these two variables do not change our results[22], we exclude them from our basic specifications because they do not seem to fit naturally into the chain of reasoning underlying our methodology.

The T term, which implies a T^2 term in the original specification (eq. 2), can be regarded as a proxy for valuable increasing economies of scale. Apparently, such an effect does not exist.

The growth rate variable really belongs to a different approach to firm valuation. The value of a firm can be determined in two ways. The first, from which we derive our methodology, says that the value of the firm is the sum of the value of its various net assets. The second says the firm's value is the present value of its expected future net cash flows. A growth rate variable definitely belongs in the second type of analysis, but is inappropriate in our use of the first. This is because we are interested in understanding the detailed nature of the firms' intangible assets, not merely in controlling for their overall effect. Thus equation (8) is an odd sort of mongrel specification. It is not surprising that *grow* is significant since the variable does belong in an alternative specification of firm value. To include it here, however, is to induce a sort of double counting because *grow* could pick up effects due to R&D, advertising and perhaps multinationality.

Another difficulty this paper shares with much econometric work is that a causal relation is not the same as a correlation. Although the event study literature indicates that

multinationality affects stock prices, and not the reverse; the interactions with R&D or advertising in our model are subject to several interpretations. Thus it might be that an additional factor not included in our model affects both left- and right-hand-side variables. For example, superior management quality might cause high q's as well as higher R&D and advertising investment in multinationals. Without a good measure of variables such as management quality, it is virtually impossible to control for this sort of problem.

As discussed in section III, our Tobin's q variable is based on accounting data, but is corrected roughly for the effects of inflation on historical costs and of interest rate changes on long term debt. These corrections may be rougher for firms with substantial tangible assets abroad or foreign denominated debt. However, this should not compromise our main result unless it induces a bias related to R&D or advertising, which seems unlikely.

Although we scaled all our variables by the value of the firm's tangible assets (T) our regressions all contained significant heteroskedasticity. We therefore employed heteroskedasticity consistent standard errors (White, 1980) throughout. Our parameters and t-ratios are therefore consistent estimates.

Another potential problem is that our estimates might be influenced by transitory macro-economic factors such as exchange rates or relative returns in the U.S. market versus various foreign markets. We therefore repeat all of our regressions using

q measures for other years. The coefficients of the various multinationality measures and of their interactions with R&D and advertising spending in regressions based on equation (6) but using financial data from 1976 through 1980 are shown in tables IX and X. Although point estimates and significance levels vary somewhat, the general pattern of positive sign and significance is unchanged. The only notable exception is the coefficients of dummies for five or more host nations or subsidiaries in the later years. The lack of significance may be because five host nations or subsidiaries is indicative of marginal rather than full blown multinationality. Thus the results in tables IX and X indicate that our findings are not an artifact of exchange rate movements or some other transitory factor.[23]

Note however that the effect of multinationality in the absence of R&D or advertising is negative in most of the specifications in tables IX and X, and significantly so in a few in the column where multinationals have more than 20 subsidiaries. We again interpret this as weak evidence that a divergence of interests between managers and shareholders may reduce firm value in multinationals, but that this effect is more than compensated for by the advantages of multinationality in exploiting intangible information based assets if they are present (note tables II and III).

VI. CONCLUSIONS

This paper examines the value of multinationality to investors, as measured by its effect on firms' q ratios. We find

that the positive impact of spending for research and development and for advertising on market value increases with a firms's multinational scale, but that multinationality *per se* does not have any significant impact. Our result supports the *internalization* theory which holds that intangible assets are necessary for direct foreign investment to make sense. It thus lends support to a recent strand of trade literature which assumes that multinational firms have intangible assets with a public goods property.

Our results do not support the hypothesis that investors value multinational firms as a means of diversifying their portfolios internationally. Nor do they support theories of the advantages of multinationality based either on tax avoidance using transfer pricing, tax havens, etc.; or on the use of cheaper labor or other production inputs in low cost countries.

We find very weak evidence that multinationality in the absence of R&D or advertising related intangibles may reduce firm value. This is consistent with the possibility that managers' decisions may be more difficult to monitor in large complex multinational firms, and that shareholders' interests may thus be neglected. Indeed, we can not rule out the possibility that diversification, tax avoidance and cheaper inputs are augmenting firm value, while manager's neglect of shareholder interests is simultaneously reducing it.

Nonetheless, the important managerial implication of our result is that there appears to be one primary justification for international expansion: it enhances the scope for using the

firm's intangible assets. The often claimed benefits -
international portfolio diversification, access to inexpensive
inputs, and tax avoidance - do not appear to be valued by
investors in most cases.

TABLE I: UNIVARIATE SAMPLE STATISTICS

	mean	standard error	minimum	maximum
Number of subsidiaries abroad (*subs*)	3.91	11.37	0	161
No. of nations hosting subsidiaries (*nats*)	2.45	5.82	0	58
Market value per $ of tangibles (*q*)	.814	.551	.128	3.99
R&D spending per $ of tangibles (*rd*)	.0249	.0430	0	.405
Advertising per $ of tangibles (*adv*)	.0234	.0616	0	.918
Leverage per $ of tangible assets (*debt*)	.279	.214	0	2.78

(sample: 1644 firms, 61.9% have no subsidiaries)

TABLE II: ORDINARY LEAST SQUARES REGRESSIONS USING
MULTINATIONALITY AS MEASURED BY NUMBER OF SUBSIDIARIES ABROAD AND
CONTROL VARIABLES TO EXPLAIN MARKET VALUE PER $ OF TANGIBLE ASSETS

left hand side variable: market value per $ of tangible assets (q)
sample size: 1644
regression includes 3 digit SIC code dummies

variable used to measure degree of multinationality	(2.1) number of subsidiaries (*subs*)	(2.2) dummy set to 1 if *subs* ≥ 5	(2.3) dummy set to 1 if *subs* ≥ 20
Degree of multinationality	.00331 (3.22)	.0841 (2.18)	.106 (1.76)
R&D spending per $ of tangibles (*rd*)	4.05 (7.93)	4.07 (8.08)	4.09 (8.08)
Advertising per $ of tangibles (*adv*)	.607 (1.45)	.609 (1.45)	.604 (1.45)
Leverage per $ of tangible assets (*debt*)	.170 (2.17)	.169 (2.15)	.166 (2.12)
R squared	.315	.314	.312

(numbers in brackets are heteroskedasticity consistent t-ratios)

TABLE III: ORDINARY LEAST SQUARES REGRESSIONS USING MULTINATIONALITY AS MEASURED BY NUMBER OF NATIONS IN WHICH FIRM HAS FOREIGN SUBSIDIARIES AND CONTROL VARIABLES TO EXPLAIN MARKET VALUE PER $ OF TANGIBLE ASSETS

left hand side variable: market value per $ of tangible assets (q)
sample size: 1644
regression includes 3 digit SIC code dummies

variable used to measure degree of multinationality	(3.1) number of nations (*nats*)	(3.2) dummy set to 1 if *nats* $\geq$ 5	(3.3) dummy set to 1 if *nats* $\geq$ 20
Degree of multinationality	.00550 (2.01)	.102 (2.43)	.161 (1.74)
R&D spending per $ of tangibles (*rd*)	4.05 (7.95)	4.06 (8.06)	4.07 (7.99)
Advertising per $ of tangibles (*adv*)	.604 (1.44)	.605 (1.44)	.603 (1.44)
Leverage per $ of tangible assets (*debt*)	.170 (2.16)	.172 (2.19)	.165 (2.11)
R squared	.315	.315	.312

(numbers in brackets are heteroskedasticity consistent t-ratios)

TABLE IV: ORDINARY LEAST SQUARES REGRESSIONS USING MULTINATIONALITY AS MEASURED BY NUMBER OF SUBSIDIARIES ABROAD, INTERACTIONS BETWEEN MULTINATIONALITY AND RESEARCH AND DEVELOPMENT AND BETWEEN MULTINATIONALITY AND ADVERTISING , AND CONTROL VARIABLES TO EXPLAIN MARKET VALUE PER $ OF TANGIBLE ASSETS

left hand side variable: market value per $ of tangible assets (q)
sample size: 1644
regression includes 3 digit SIC code dummies

variable used to measure degree of multinationality	(4.1) number of subsidiaries (*subs*)	(4.2) dummy set to 1 if *subs* ≥ 5	(4.3) dummy set to 1 if *subs* ≥ 20
Degree of multinationality	.00008 (0.05)	-.00151 (0.03)	-.106 (1.24)
Multinationality x R&D spending	.0185 (0.81)	2.33 (2.03)	3.67 (1.82)
Multinationality x advertising	.0458 (2.92)	.189 (0.20)	2.67 (1.34)
R&D spending per $ of tangibles (*rd*)	3.97 (7.49)	3.64 (6.64)	3.82 (7.23)
Advertising per $ of tangibles (*adv*)	.500 (1.14)	.611 (1.34)	.614 (1.46)
Leverage per $ of tangible assets (*debt*)	.161 (2.04)	.165 (2.07)	.157 (1.97)
R squared	.319	.318	.319

(numbers in brackets are heteroskedasticity consistent t-ratios)

TABLE V: ORDINARY LEAST SQUARES REGRESSIONS USING MULTINATIONALITY AS MEASURED BY NUMBER OF NATIONS IN WHICH FIRM HAS FOREIGN SUBSIDIARIES, INTERACTIONS BETWEEN MULTINATIONALITY AND RESEARCH AND DEVELOPMENT AND BETWEEN MULTINATIONALITY AND ADVERTISING, AND CONTROL VARIABLES TO EXPLAIN MARKET VALUE PER $ OF TANGIBLE ASSETS

left hand side variable: market value per $ of tangible assets (q)
sample size: 1644
regression includes 3 digit SIC code dummies

variable used to measure degree of multinationality	(5.1) number of nations ($nats$)	(5.2) dummy set to 1 if $nats \geq 5$	(5.3) dummy set to 1 if $nats \geq 20$
Degree of multinationality	.000344 (0.10)	.0102 (0.19)	-.115 (1.23)
Multinationality × R&D spending	.0475 (0.91)	2.41 (1.97)	2.03 (1.28)
Multinationality × advertising	.0781 (1.22)	.140 (.141)	6.25 (3.54)
R&D spending per $ of tangibles (rd)	3.90 (7.27)	3.67 (6.75)	3.99 (7.50)
Advertising per $ of tangibles (adv)	.479 (1.04)	.608 (1.36)	.587 (1.39)
Leverage per $ of tangible assets ($debt$)	.159 (2.01)	.166 (2.08)	.160 (2.03)
R squared	.317	.319	.321

(numbers in brackets are heteroskedasticity consistent t-ratios)

TABLE VI: ORDINARY LEAST SQUARES REGRESSIONS USING NUMBER OF
SUBSIDIARIES IN DEVELOPED COUNTRIES, LESS DEVELOPED COUNTRIES AND
TAX HAVENS, AND CONTROL VARIABLES TO EXPLAIN MARKET VALUE PER $ OF
TANGIBLE ASSETS

left hand side variable: market value per $ of tangible assets (q)
sample size: 1644
regression includes 3 digit SIC code dummies

	(6.1)
No. of subsidiaries in d.c.'s (dc)	.00545 (1.75)
No. of subsidiaries in l.d.c.'s (ldc)	.00315 (0.494)
No. of subsidiaries in tax havens (th)	.0121 (0.473)
R&D spending per $ of tangibles (rd)	4.06 (2.98)
Advertising per $ of tangibles (adv)	.599 (1.44)
Leverage per $ of tangible assets $(debt)$	.171 (2.18)
R squared	.315

(numbers in brackets are heteroskedasticity consistent t-ratios)

TABLE VII: ORDINARY LEAST SQUARES REGRESSIONS USING MULTINATIONALITY AS MEASURED BY NUMBER OF SUBSIDIARIES ABROAD, INTERACTIONS BETWEEN MULTINATIONALITY AND RESEARCH AND DEVELOPMENT AND BETWEEN MULTINATIONALITY AND ADVERTISING, AND CONTROL VARIABLES INCLUDING FIRM SIZE AND LABOR FORCE GROWTH TO EXPLAIN MARKET VALUE PER $ OF TANGIBLE ASSETS

left hand side variable: market value per $ of tangible assets (q)
sample size: 1644
regression includes 3 digit SIC code dummies

variable used to measure degree of multinationality	(7.1) number of subsidiaries (*subs*)	(7.2) dummy set to 1 if *subs* ≥ 5	(7.3) dummy set to 1 if *subs* ≥ 20
Degree of multinationality	.00104 (1.64)	.0179 (0.38)	-.0685 (0.77)
Multinationality × R&D spending	.0188 (2.87)	1.70 (1.69)	3.95 (2.02)
Multinationality × advertising	.0400 (2.41)	.194 (0.20)	2.31 (1.21)
R&D spending per $ of tangibles (*rd*)	3.62 (6.58)	3.44 (5.93)	3.43 (6.26)
Advertising per $ of tangibles (*adv*)	.543 (1.24)	.627 (1.40)	.657 (1.57)
Leverage per $ of tangible assets (*debt*)	.211 (2.27)	.212 (2.28)	.208 (2.23)
Firm size (*T*)	-.0000047 (0.84)	-.0000041 (0.77)	-.0000035 (0.62)
Labor force growth rate (*grow*)	.301 (5.34)	.295 (5.25)	.304 (5.37)
R squared	.356	.352	.358

(numbers in brackets are heteroskedasticity consistent t-ratios)

TABLE VIII : ORDINARY LEAST SQUARES REGRESSIONS USING MULTINATIONALITY AS MEASURED BY NUMBER OF NATIONS IN WHICH FIRM HAS FOREIGN SUBSIDIARIES, INTERACTIONS BETWEEN MULTINATIONALITY AND RESEARCH AND DEVELOPMENT AND BETWEEN MULTINATIONALITY AND ADVERTISING, AND CONTROL VARIABLES INCLUDING FIRM SIZE AND LABOR FORCE GROWTH TO EXPLAIN MARKET VALUE PER $ OF TANGIBLE ASSETS

left hand side variable: market value per $ of tangible assets (q)
sample size: 1644
regression includes 3 digit SIC code dummies

variable used to measure degree of multinationality	(8.1) number of nations (nats)	(8.2) dummy set to 1 if nats ≥ 5	(8.3) dummy set to 1 if nats ≥ 20
Degree of multinationality	.000198 (0.54)	.0326 (0.63)	-.0785 (0.74)
Multinationality × R&D spending	.0437 (0.95)	1.76 (1.67)	2.38 (1.53)
Multinationality × advertising	.0675 (1.05)	.174 (0.18)	5.78 (2.12)
R&D spending per $ of tangibles (rd)	3.57 (6.32)	3.47 (6.00)	3.61 (6.55)
Advertising per $ of tangibles (adv)	.525 (1.13)	.621 (1.39)	.625 (1.48)
Leverage per $ of tangible assets (debt)	.208 (2.24)	.213 (2.28)	.210 (2.27)
Firm size (T)	-.0000052 (0.86)	-.0000044 (0.82)	-.0000028 (0.48)
Labor force growth rate (grow)	.300 (5.32)	.295 (5.27)	.300 (5.32)
R squared	.353	.353	.358

(numbers in brackets are heteroskedasticity consistent t-ratios)

TABLE IX: OLS REGRESSIONS USING MULTINATIONALITY AS MEASURED BY NUMBER OF FOREIGN SUBSIDIARIES, INTERACTIONS, AND CONTROL VARIABLES TO EXPLAIN Q FOR 1976 THROUGH 1980.

additional RHS variables: 3 digit SIC code dummies, *rd*, *adv*, and *debt*.	degree of multinationality			dependant variable *q* is for year
	number of subsid.'s (*subs*)	dummy set to 1 if *subs* ≥ 5	dummy set to 1 if *subs* ≥ 20	
degree of multinationality	-.00394 (2.18)	-.00170 (0.33)	-.160 (2.11)	1976
Multinationality × R&D spending	.256 (4.77)	3.95 (2.60)	11.3 (5.03)	
Multinationality × advertising	.00974 (0.30)	-.374 (0.54)	.284 (0.16)	
degree of multinationality	-.000227 (0.16)	-.00228 (0.48)	-.103 (1.46)	1977
Multinationality × R&D spending	.0240 (1.04)	2.62 (2.29)	3.59 (2.14)	
Multinationality × advertising	.0525 (3.13)	.496 (0.51)	2.10 (1.11)	
Degree of multinationality	.000008 (0.05)	-.00151 (0.031)	-.106 (1.24)	1978
Multinationality × R&D spending	.0185 (0.81)	2.33 (2.03)	3.67 (1.82)	
Multinationality × advertising	.0458 (2.92)	.189 (0.20)	2.67 (1.34)	
degree of multinationality	-.00215 (1.36)	.0234 (0.43)	-.199 (2.31)	1979
Multinationality × R&D spending	.0239 (1.28)	1.64 (1.35)	4.32 (1.99)	
Multinationality × advertising	.0366 (2.14)	-.128 (0.14)	1.77 (1.08)	
degree of multinationality	-.00580 (3.09)	-.0464 (0.70)	-.316 (3.58)	1980
Multinationality × R&D spending	.155 (3.29)	1.77 (1.12)	7.82 (3.99)	
Multinationality × advertising	.0142 (0.95)	.713 (0.96)	1.87 (1.34)	

(numbers in brackets are heteroskedasticity consistent t-ratios)

TABLE X: OLS REGRESSIONS USING MULTINATIONALITY AS MEASURED BY NUMBER OF NATIONS IN WHICH FIRM HAS FOREIGN SUBSIDIARIES, INTERACTIONS, AND CONTROL VARIABLES TO EXPLAIN Q FOR 1976 - 1980.

additional RHS variables: 3 digit SIC code dummies, rd, adv, and debt.	degree of multinationality			dependant variable q is for year
	number of nations (nats)	dummy set to 1 if nats ≥ 5	dummy set to 1 if nats ≥ 20	
degree of multinationality	-.00521 (1.62)	-.0384 (0.70)	-.236 (2.21)	1976
Multinationality × R&D spending	.406 (4.25)	4.69 (2.91)	12.00 (4.42)	
Multinationality × advertising	.0120 (0.23)	-.354 (0.50)	2.53 (1.12)	
degree of multinationality	-.00120 (0.41)	-.0202 (0.39)	-.118 (1.42)	1977
Multinationality × R&D spending	.0621 (1.18)	2.48 (2.04)	2.37 (1.44)	
Multinationality × advertising	.0980 (1.52)	.564 (0.55)	5.23 (2.36)	
degree of multinationality	.000344 (0.10)	.0102 (0.19)	-.115 (1.23)	1978
Multinationality × R&D spending	.0475 (0.91)	2.41 (1.97)	2.03 (1.28)	
Multinationality × advertising	.0781 (1.22)	.140 (0.14)	6.25 (3.54)	
degree of multinationality	-.00482 (1.47)	-.0265 (0.44)	-.171 (1.73)	1979
Multinationality × R&D spending	.0553 (1.33)	1.61 (1.25)	3.06 (1.62)	
Multinationality × advertising	.0588 (0.90)	-.0465 (0.05)	4.67 (2.30)	
degree of multinationality	-.00984 (2.54)	-.0553 (0.76)	-.216 (1.75)	1980
Multinationality × R&D spending	.219 (2.54)	1.32 (0.79)	7.11 (3.32)	
Multinationality × advertising	.0619 (1.21)	.869 (1.09)	2.94 (1.39)	

(numbers in brackets are heteroskedasticity consistent t-ratios)

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FOOTNOTES

[1] This view is developed in Coase (1937), Williamson (1975), Hymer (1960:1976), Caves (1971), Dunning (1973), Buckley and Casson (1976), Magee (1977), Hennart (1977:1982), and Rugman (1981).

[2] See Caves (1986), chapter 1, for a more detailed explanation.

[3] Recent work has connected this internalization theory to trade theory. (See eg. Helpman (1984), Markusen (1984), Ethier (1986), and Horstman and Markusen (1987). These papers develop trade models based on the premise that multinational firms have a factor of production which behaves like a public good. Given the growing popularity of the internalization theory and the recent incorporation of it in trade theory, it is important to subject the idea to empirical investigation.

[4] See e.g. Agmon and Lessard (1977), Rugman (1979), Brewer (1981), Adler (1981), Adler and Dumas (1983), Errunza and Senbet (1981, 1984), Fatemi (1984) and others.

[5] See e.g. Jensen and Meckling (1976), Demsetz and Lehn (1985), etc.

[6] Under the assumption of financial market efficiency, higher earnings (or costs) should be capitalized into share prices. Thus, past multinational expansion should be related to high share value (i.e. high q), not high current returns to shareholders. If multinational expansion took place before the firm's initial public offering, a high ratio of intangible to tangible assets need not imply that *public* shareholders ever enjoyed unusual returns.

[7] This idea also leads some (e.g. Rugman, 1987) to argue that returns on foreign direct investment are returns on services.

[8] Adler (1981) and Adler and Dumas (1983) argue that even if investment markets are segmented, investors may still not attach value to any single multinational firm for the benefit of indirect international diversification. We return to this point below.

[9] In addition, Fatemi (1984) confirms the Agmon and Lessard (1977) finding and also concludes that risk adjusted returns on multinational and uninational firms behave similarly.

[10] Defined as stock value minus accounting net worth normalized by sales.

[11]Errunza and Senbet (1984), p. 741.

[12]The market value of the firms is obtained from the Griliches N.B.E.R. productivity project's database as described in Cummins *et al.* (1982). The market value of the common stock is the price per share times the number of shares outstanding. The value of the preferred stock is estimated as the preferred dividends paid out during the year divided by the Moody's preferred dividend rate for medium risk firms. The value of the firm's long-term debt is estimated by using an age of debt profile constructed using changes in book value of long-term debt in previous years and assuming that only 20 year bonds were issued. Moody's corporate BAA bond price series is then used to estimate the market value of the long-term debt. The market value of total debt is estimated as the estimated market value of long term debt plus the book value of short-term debt minus the firm's net short term assets. The underlying data are from the Standard and Poor's Compustat database.

[13]This variable is also from the Griliches N.B.E.R. R&D Master File as described in Cummins *et al.* (1982). The average age of the firm's plant and equipment is deduced by dividing accumulated depreciation (gross plant minus net plant) by the current year's depreciation. A time series of these age figures is smoothed slightly, and then used to adjust the book values reported on Compustat for inflation. The book value of the firm's inventories is used unless the firm specifies a L.I.F.O. inventory accounting method. In that case, inventories are adjusted for inflation in a way analogous to the method used for plant and equipment. Again, all underlying data are from the Standard and Poor's Compustat tape.

[14]We also performed our basic tests (Tables II through V) using book value of tangible assets and a firm value estimate based on book debt and market value of equity. The results were qualitatively similar to those presented below.

[15]Research and development spending and advertising expenditures are taken from the Griliches N.B.E.R. R&D Master file as described in Cummins *et al.* (1982). The values there are taken from the Standard and Poor's Compustat tape. Firms which fail to report these variables are assumed to engage in no research and development or advertising.

[16]*DEBT* is equal to the estimated value of the firm's long term debt as described in footnote 10 *supra* plus the book value of current liabilities.

[17]Note that the definition of β_0 has been changed slightly. It should now be one (rather than zero) if there are no missing intangibles related to firm size.

[18]This data is obtained from the *International Directory of Corporate Affiliations* - 1980/81, National Register Publishing Co., a MacMillan company, Skokie, Il.

[19]Diversification should be better measured by the number of nations in which the firm operates than by the number of foreign subsidiaries it controls. However, these two measures of multinationality have comparable significance in explaining shareholder value. This bodes somewhat ill for the diversification story, but is not inconsistent with it since the two measures are highly correlated ($\rho=.90$ confidence level=0.0001).

[20]Developed countries consist of Canada, Australia, New Zealand, Japan, and the Western European countries. Tax havens consist of the Bahamas, Barbados, the Netherlands Antilles, the Virgin Islands, the Channel Islands, Liechtenstein, etc. and are treated separately since they fit into neither primary category. All remaining countries are l.d.c.'s.

[21]Note that the earlier empirical literature sometimes regards R&D and advertising as proxies for superior management.

[22]Other size measures such as $log(T)$, *sales*, *log(sales)*, etc. were also included. None were significant and none changed our basic results.

[23]As an additional test of this possibility, we include dummies for the presence of the firm in different regions of the world. None of the dummies was significant. In particular, there is no apparent difference between subsidiaries in fixed vs. floating rate jurisdictions.