

Do Multinational Operations Influence Firm Value? Evidence from the Triad Regions

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Abstract

This paper examines the effect of multinational operations on firm value using a sample of firms from the three triad regions of the world. Using the Transnational Index (reported by the United Nations), a newer measure of multinational operations, this study helps explain some of the conflicting findings reported in the literature and highlights the importance of location of the firm as a factor in influencing the premium or discount in firm value due to multinational operations.

Key words: multinational operations; firm value; transnational index

JEL classification: F23

1. Introduction

International operations of multinational companies are growing at an explosive pace. The impact of these multinational companies on the prosperity and growth of the world economy has made them a topic of significant interest. For instance, employees of foreign affiliates of these firms jumped from 24 million in 1990 to 54 million in 2001. Sales of these affiliate companies are \$19 trillion, which account for one tenth of world GDP and one third of world exports (United Nations, 2002). The importance of multinational operations and its relationship to the valuation of these companies has been an important research question. While the number of studies has helped us increase our understanding of this topic, their findings however are in conflict with one another. Recent studies (e.g., Denis et al., 2002, and Christophe and Pfeiffer, 2002) report a discount to firm value when associated with multinational operations. On the other hand, other researchers have documented a premium to firm value associated with multinational operations (e.g.,

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Ramirez-Aleson and Espitia-Escuer, 2001; Mishra and Gobeli, 1998; and Morck and Yeung, 1991). Pantzalis (2001) found different effects, depending upon the economic development of the foreign countries where the firm operated. Given the variation in previous findings reported in the literature, one could claim there is a significant need for additional research on this topic.

The logic for multinational operations has been well articulated in the literature. Hymer (1976) proposed that multinational firms exist because they possess “unique assets” in terms of products, processes, and skills. They operate multinationally because they will be able to exploit firm-specific knowledge and intangible wealth to a larger degree by operating in both domestic and international markets, rather than the domestic market alone (Caves, 1971). Firms that wish to maximize revenue through overseas operations may want to sell or license their assets to other firms in other countries rather than operate directly in an overseas market. However, the market for firm-specific tangible and intangible assets is imperfect, resulting in high transaction costs (Williamson, 1975). The reason for high transaction costs is the uncertain nature of the demand for the product and service in a new environment. Firm-specific assets, such as firm-specific knowledge (which is tacit in nature), are also hard to transfer across firms or nations (Winter, 1987). These circumstances force a firm to internalize transactions by moving overseas directly. By internalizing foreign activities, a firm is able to avoid the disadvantages inherent in market transactions and to capitalize on its assets (Dunning, 1980). This type of rationalization, which is based on transaction cost economics, has been referred to as the theory of internalization (Rugman, 1980). The internalization of operations also allows for the firm to exploit economies of scope and synergy by operating in multiple regions of the world.

The notion of imperfect capital markets has also been used as an argument for a firm to operate internationally. Fatemi (1984) argued that many investors could be discouraged from investing in overseas markets efficiently due to information asymmetries or other barriers. Firms with international operations could provide an alternative for shareholders seeking to get the benefits of international diversification. These benefits to investors have been presented in previous studies (e.g., Mathur and Hanagan, 1983). Multinational operations may allow firms to gain better operational advantages through tax planning and gain access to low-cost inputs from international markets that may not be available locally (Morck and Yeung, 1991). Some scholars have also argued that multinational operations increases flexibility for firms, thereby reducing risks in operations (Kogut, 1985). These firms can reduce the adverse impact of changes in prices of goods, interest rates, labor, and raw materials by shifting their operations across nations. These dynamic options are available to a firm with multinational operations. This logic has been referred to as the multinational network hypothesis or MNH (Pantzalis, 2001).

While the internalization and MNH approaches highlight the benefits of multinational operations, multinational operations also bring about increased complexity and costs within the firm and the possibility of more profitable units subsidizing inefficient ones (Denis et al., 2002). Morck and Yeung (1991) offer

managerial objectives as another variable that may lead to a reduction in value for multinational as opposed to unination firms, since these objectives may differ from the investor objective of share-price maximization. International operations could be used by managers to reduce employment risk in addition to increasing managerial power, as it is much harder for shareholders to monitor international operations. Therefore, one could say that only if the benefits of multinational operations outweigh the negatives, the degree of international involvement of a firm will impact the value of the firm positively.

The arguments presented in the internalization and MNH approaches call for a broader operationalization of multinational operations. Previous studies on this topic largely use a firm's level of foreign sales to total sales (foreign sales ratio), the number of foreign subsidiaries, or a count of geographic regions in which a firm operates to measure multinational operations (see Table 1). This study seeks to incorporate a newer, multidimensional measure of multinational operations. Such a multidimensional measure is able to capture many of the benefits articulated by the internationalization and MNH approaches. Sullivan (1993) pointed out that limiting the measurement of the degree of multinational operations to a single aspect may lead to "spurious confirmation or distorted estimates of the relationships" being evaluated (p. 327). In a similar vein, researchers like Pantzalis (2001) have added "...The use of unidimensional measures of international involvements (such as the foreign sales ratio, the foreign assets ratio, the number of foreign countries, or the number of foreign subsidiaries) in studies of the relationship between multinationality and performance has produced inconsistent results ..." (p. 135). Compared to the traditional one-dimensional measures reported in many previous studies, we use a multidimensional measure: the Transnational (TN) Index reported by the United Nations. This index captures the extent of multinational operations that take place through international sales, assets, and employees.

The logic of such a multidimensional measure becomes obvious when one looks at international operations of many firms. For example, a firm can internationalize in many ways. A firm could set up multinational operations in other countries using a combination of one or more of the following: local employees, local assets, and sales. Focusing on one of these dimensions may not be representative of the construct of multinational operations. Two examples from this study sample are illustrative of this fact. For instance, in 1998, Chevron Corporation reported a foreign employee ratio of 22.9% and a foreign assets ratio of 46.3%, yet their foreign sales ratio was a mere 6.7%. Another extreme example would be Carnival operations for the year 2000. This company reported a foreign employee ratio of 84.4% and a foreign assets ratio of 93.9%, but its foreign sales accounted for a minuscule 15.8% of the firm's total sales. Therefore the context warrants multidimensional measures, since the usage of the foreign sales ratio alone does not capture this form of multinational operations. The continuing increase in foreign direct investment (FDI) by firms in overseas markets supports this contention. The usage of multidimensional measures is also consistent with the suggestion of Errunza and Senbet (1984) to use other measures, rather than just the foreign sales ratio, to capture multinational operations.

Table 1. Review of Past Research on the Impact of Multinational Operations on Firm Value

Findings	Study	Sample	Country	Firm Value Measure Basis	Global Diversification Measure Basis
<i>Studies Reporting Premium in Firm Value</i>	Ramirez-Aleson and Espitia-Escuer 2001	1991-1995	Spain	Tobin's q	Geographical area count Foreign country count
	Bodnar, Tang, and Weintrop 2000	1984-1997	United States	Excess equity value to sales ratio Market-to-book ratio	Dummy indicator
	Mishra and Gobeli 1998 ^A	1986-1988	United States	Market value to book value of total assets	Foreign sales Foreign subsidiary count
	Morck and Yeung 1991 ^A	1978	United States	Tobin's q	Foreign subsidiary count Foreign country count
	Kim and Lyn 1986	1974-1978	United States	(Market value – Net worth) / Annual sales	Foreign sales Foreign subsidiary count
	Errunza and Senbet 1981 ^B	1968-1977	United States	(Market value – Net worth) / Annual sales	Foreign sales Foreign assets Foreign net income
<i>Studies Reporting Discount in Firm Value</i>	Denis, Denis, and Yost 2002	1984-1997	United States	Actual value versus imputed value (Excess value)	Foreign sales
	Christophe and Pfeiffer 2002	1990-1994	United States	Tobin's q	Foreign sales
	Click and Harrison 2000	1984-1997	United States	Tobin's q Book equity to market equity ratio	Foreign sales Foreign country count
	Christophe 1997	1978-1986	United States	Tobin's q	Foreign sales
<i>Studies Reporting Mixed Results in Firm Value</i>	Pantzalis 2001 ^C	1990	United States	Tobin's q Tobin's q versus imputed Tobin's q (Excess value)	Foreign subsidiary count Geographical area count
	Errunza and Senbet 1984 ^D	1970-1978	United States	(Market value – Net worth) / Annual sales	Foreign sales Foreign subsidiary count

Notes: ^A These studies show that the premium in firm value for multinational firms was due to the presence of firm-specific intangibles such as R&D spending, advertising spending, or managerial compensation incentives. Without these intangibles, multinational operations appear to have no significant value. ^B A positive relationship between firm value and multinational operations was found using foreign sales as the multinationality measure. Foreign assets and foreign net income produced insignificant results. ^C The results are considered "mixed", as different effects on firm value were found for firms involved in advanced economies (negative impact) and in developing economies (positive). ^D Positive relationships were found between firm value and the multinationality measures of foreign sales percentage and an entropy measure of foreign subsidiaries. However, a negative relationship was found between firm value and the absolute number of foreign subsidiaries.

This study uses a sample of firms from the three triad regions of the world, namely, North America (note that this and subsequent references to the North American economy refer to U.S. and Canadian firms only), Continental Europe, and Japan. Corporations based in these regions constitute about 80% of the reported largest multinational firms in the world; thus it would be quite useful to verify whether the relationship between firm value and international operations holds across these regions. The majority of studies on this topic have been largely focused on U.S.-based firms. Using this sample of triad regions allows us to see if the benefits of multinational operations are consistent across varied environments.

Study findings using the TN Index as a measure indicate that firms based in North America face a reduction in firm value due to multinational operations, while firms based in Continental Europe and Japan show an increase in value. This finding is consistent with traditional measures of multinational operations, e.g., the foreign sales ratio and foreign assets ratio, used in the previous literature. The foreign employee ratio showed a marginal positive relationship with firm value for Continental European firms. The strong and consistent results with the TN Index across the triad regions indicate that its broad depiction of a firm's international reach provides a multidimensional measure of multinational operations for other researchers to consider.

2. Literature Review

The number of papers examining the benefits of multinational operations and firm value has grown significantly in recent years since the early work of Errunza and Senbet (1981, 1984). Past studies have provided valuable insight on this issue by developing the foundations for research in this area of vital interest in the interconnected world. However, previous studies evaluating these effects have provided conflicting results. In this section we review the work of these researchers and present the results of the studies in three pools based upon the results obtained by them. Table 1 provides a list of the studies discussed here, with a brief summary of their sample and measurement characteristics.

2.1 Studies reporting premium in firm value

Errunza and Senbet (1981) conducted one of the earliest studies on this topic, comparing the value of firms having international operations with purely domestic firms. They found a premium for U.S. multinational firms during the 1970s based on the extent of multinational operations that included several parameters, e.g., foreign sales, foreign assets, and foreign net income. They found a significant and positive correlation between the level of foreign sales and a firm's excess valuation, which was defined as the differential between the market value of equity and net worth normalized by sales. However, no significant relationship was found between firm value and either foreign assets or foreign net income. Kim and Lyn (1986), evaluating U.S. firms from 1974 to 1978, also found a positive relationship between firm value and the level of multinational operations represented by the foreign sales

ratio. Their results could not, however, confirm any significant relationship between firm value and the number of foreign subsidiaries, a parameter used often in later studies.

Morck and Yeung (1991) reviewed U.S. firm data from 1978. Their global diversification measures relied on the number of foreign subsidiaries and the number of countries with operations. Both diversification measures resulted in higher firm values, based on Tobin's q . Mishra and Gobeli (1998) used updated data (1986 to 1989) in their study of U.S. multinational manufacturing firms. Global diversification was measured using the number of foreign subsidiaries and foreign sales, while firm value was measured using the ratio of market value to book value of total assets. Mishra and Gobeli (1998) confirmed what Morck and Yeung (1991) established in their study. The premium in firm value was found to have no significance without the presence of firm-specific intangibles. In Morck and Yeung's (1991) case, these intangibles included R&D spending and advertising spending, while Mishra and Gobeli's (1998) intangibles included R&D spending and managerial compensation incentives.

Bodnar et al. (2000) extended the sample years of U.S. firms into the 1990s (1984 to 1997). They selected a very simple global diversification measure, essentially a dummy variable activated if any non-U.S. segment reported any revenue, income, or asset data. Their study measured the effects on firm value using two measures. The first measure, the excess equity value to sales ratio, ranged from 0.71 (industrially diversified) to 0.155 (non-industrially diversified), and was greater for the globally diversified firm than the comparable domestic firm. Similar results were found using the market-to-book ratio, identified as a close proxy to Tobin's q , as the second value measure. The premium range for globally diversified firms here was from 0.253 to 0.340. Bodnar et al. (2000) continue by reporting that, after taking into account several controlling factors and self-selection bias, the globally diversified firm reduced the premium to the firm's value to 2.7%. Ramirez-Aleson and Espitia-Escuer (2001) approached their study on a narrower basis, concerned primarily with Spanish firms from 1991 to 1995. Their value measure was Tobin's q , while their global diversification measures concentrated on indices based on the counts of foreign countries and geographical regions with operations. As in previous studies that focused on American firms, Ramirez-Aleson and Espitia-Escuer (2001) found that as the global diversification level of Spanish firms increased, the firms' market value also increased.

2.2 Studies reporting discount in firm value

Christophe (1997) used a Tobin's q measure to represent the firm's value and the percentage of foreign sales as the basis for their global diversification measure. Using U.S. firms during the period 1978 to 1986, he reported a negative correlation between firm value and global diversification. Click and Harrison (2000) also used a Tobin's q measure to quantify firm value, but added the ratio of the firm's book equity to its market equity as a second measure. They also updated the timeframe of interest to 1984–1997 for U.S. firms and included additional variables to measure

the extent of global diversification, namely the foreign sales ratio, a dummy variable indicating the presence of foreign sales, and the number of foreign countries with operations. Significant relationships were only found, however, in three of these variables. Click and Harrison (2000) discovered discounts to a firm's Tobin's q equaling 8.6% using the foreign sales percentage of total sales, 17.1% using the dummy variable, and 11.7% using the country count. Based on the book equity to market equity ratio, the discount was slightly smaller, ranging from 3.5% to 9.7%.

Christophe and Pfeiffer (2002) analyzed U.S. firms from 1990 to 1994 using Tobin's q as the proxy for firm value and foreign sales as the global diversification measure basis. A discount to firm value was found for firms with multinational operations, while a premium to firm value existed for domestic operations. Denis et al. (2002) compared the actual value versus the imputed value of U.S. firms from 1984 to 1997 based on the level of foreign sales from foreign operations, thus excluding export sales. In addition to determining that the discount to firm value due to global diversification was about 0.18, they also found that this discount increases as the extent of global diversification increases.

2.3 Studies reporting mixed results in firm value

Errunza and Senbet (1984), in a follow-up to their 1981 study, examined the relationship between the degree of diversification and firm value using three different analysis techniques. With all three methods, they found significantly positive relationships between firm value and foreign sales and firm value and an entropy measure of foreign subsidiaries. However, a negative relationship between firm value and the number of subsidiaries was found to exist. Based on these results, Errunza and Senbet (1984) recommended that future studies evaluate global diversification measures other than foreign sales. Pantzalis (2001) extended the diversification versus firm value research by evaluating the effects within different market levels. Using data from 1990 on 420 U.S.-based mining and manufacturing firms, he found that global diversification's impact on firm value resulted in a premium for firms that had operations in developing economies, while those firms operating solely in advanced markets experienced a discount.

Despite the existence of numerous studies which provide insights on the relationship between multinationality and firm value, the conflicting sets of results reported highlight the need for additional research on this topic. This study seeks to add to the extant literature on this topic by addressing two unexplored questions. First, it is not evident if previous findings were biased due to their use of unidimensional measures to capture multinational operations. Therefore, we use a multidimensional measure to measure the degree of global diversification. This multidimensional measure, referred to as the TN Index, comprises three dimensions, i.e., foreign sales ratio, foreign assets ratio, and foreign employment ratio. We believe such a multidimensional measure will allow for the capture of the benefits on international operations argued by internalization and MNH research compared to measures used in previous literature. The second question this study seeks to answer is if the pattern of results holds across the triad regions. It is imperative to

see if the results hold across nations, as the degree of information asymmetry posited by the notion of imperfect capital markets and the network benefits posited by the MNH vary by the home country of the multinational. The following section elaborates on the data and methodology used in the study.

3. Data and Methodology

The initial sample of firms for our study, referred to as “transnational corporations,” was taken from the annual list of the largest firms in the world, published in the *World Investment Report* (1996–2002) by the United Nations. The top firms, ranked by foreign assets, were extracted for the years 1994 through 2000. These firms were analyzed as parts of the three triad regions, namely North America (the U.S. and Canada), Continental Europe (Germany, France, the Netherlands, Italy, and Switzerland) and Japan, due to differences in firm characteristics across the three regions. The initial count of 662 firms was matched with financial and firm level data from the WorldScope database. Many firms do not report the type of foreign information we sought for this study, and firms were eliminated from the sample if financial or firm information was missing from WorldScope. In the end, the final sample size totaled 297 firms for the years 1994 through 2000.

Using past research as a guide, we believe many other variables influence firm value. The model and its control variables employed in this study are consistent with models used by Pantzalis (2001), Mishra and Gobeli (1998), Morck and Yeung (1991), Errunza and Senbet (1984), and others in studies on this topic. The regression model used in this study can be written in the following form:

$$FIRM\ VALUE = \beta_0 + \beta_1 MO + \beta_2 CFocus + \beta_3 RD + \beta_4 RISK + \beta_5 GROWTH + \beta_6 LEVERAGE + \beta_7 SIZE + \beta_8 INDUSTRY + \beta_9 YEAR \quad (1)$$

where *MO* represents the level of multinational operations, determined using the four parameters from the UN Transnational Lists discussed previously (the TN Index, foreign sales ratio, foreign assets ratio, and foreign employment ratio). The foreign sales ratio and foreign assets ratio have been repeatedly used as global diversification representations in other studies (e.g., Errunza and Senbet, 1984, and Christophe, 1997). The ratio of foreign employment to total employment has not been utilized as a global diversification measure. A multidimensional measurement, namely the TN Index, incorporates all three of these ratios into one measurement. It is hoped that this new measure will provide a valid representation of a firm’s level of global diversification that can be used in future studies by researchers. Several previous studies use a count of the foreign subsidiaries with operations as a basis for measuring multinationality. We found, however, that while this information is readily available for U.S.-incorporated firms, the same is not true for foreign-based corporations.

CFocus represents the level of corporate focus of the firm, where higher values equate to higher levels of focus, i.e., less industrial diversification. It is a parameter similar to the operationalization used by Pantzalis (2001) and equals the ratio of a

firm's related diversification (represented by the number of four-digit SIC codes within the firm's primary two-digit industry code) to the total related and unrelated diversification of the firm (represented by the number of two-digit SIC codes outside the firm's primary two-digit industry code). The variable *RD* represents the level of R&D spending as a percentage of sales. The level of R&D intensity controls for any valuation effects due to spending on R&D, which can vary widely by firm and industry. Indicative of this variation among firms is the possession of unique technological know-how resulting from R&D investment. Internationalization theory supports the presence of such an intangible asset as a precursor to increased firm value; therefore R&D must be controlled for if we are to separate its effect on firm value from the multinationality effects we seek. Previous studies by Grabowski and Mueller (1978) and Branch (1974) have shown that corporations in R&D-intensive industries receive above-average returns.

The variable *RISK* represents the level of systematic risk of the firm, depicted using beta. By diversifying globally, the firm-specific risk decreases as a corporation reduces its exposure to a single economy. The variable *GROWTH* represents the growth rate of the firm, operationalized as the change in net sales, and controls for any influence of firm growth on the valuation of a firm (Bae and Noh, 2001). The variable *LEVERAGE*, representing the firm's debt to equity ratio, controls for any firm value effects due to any differences in the debt structures of the firms. The variable *SIZE*, which represents the firm's size, is used as a proxy to control for scale effects. Berger and Ofek (1995), Lang and Stulz (1994), and Errunza and Senbet (1984) have shown that firm size has a positive relationship with the market value of the firm. In our study, we used the natural log of total assets as a representation of a firm's size. The variable *INDUSTRY* is a dummy variable used to control for any valuation impacts due to the business models within each firm which may vary from general industry effects, growth, or trends (industries were categorized into nine groups, namely, Electrical/Electronics, Food, Manufacturing, Motor Vehicles and Parts, Petroleum/Chemicals, Pharmaceuticals, Services, Utilities, and Conglomerate). Finally, the variable *YEAR* is a dummy variable used to control for any valuation effects related to specific years and the economic trends that may occur during the time period in question.

The dependent variable, *FIRM VALUE*, is calculated in two ways, both similar to the Tobin's *q* value utilized by several other researchers. We define the first firm value variable *q* as the ratio of the sum of the market value of common equity, the book value of preferred stock, the book value of long term debt, and the book value of short term liabilities minus the book value of short term assets to the book value of the firm's total assets. This variation was originally developed by Chung and Pruitt (1994) as a proxy for Tobin's *q*, developed by Thomadakis (1977), and then later utilized by Christophe (1997) and Pantzalis (2001). Similar variations were used by Mishra and Gobeli (1998) and Click and Harrison (2000). The second firm value variable, *MTB*, was defined by Bodnar et al. (2000) as the ratio of the sum of the market value of common equity, the book value of liabilities, and the book value of preferred stock to the book value of the firm's total assets. Using multiple indices

to improve the reliability of a measure, referred to as triangulation (Campbell and Fiske, 1959), helps provide robustness for our study. It should be noted here that in order to allow direct comparisons, all financial-related variables were converted to U.S. dollars using conversions calculated from WorldScope data.

4. Results

Descriptive statistics for the sample are reported in Table 2.

Table 2. Descriptive Statistics for the Full Sample (N=297)

Variable	Operationalization	Mean	Standard Deviation	Minimum	Maximum
TN Index	Average of foreign sales ratio, foreign assets ratio, and foreign employment ratio	50.234	19.831	13.7	97.6
Foreign Sales Ratio	Ratio of foreign sales to total sales	0.553	0.226	0.122	0.986
Foreign Assets Ratio	Ratio of foreign assets to total assets	0.471	0.212	0	0.982
Foreign Employment Ratio	Ratio of foreign employment to total employment	0.496	0.207	0.063	0.973
Corporate Focus	Ratio of related diversification to total diversification	0.628	0.245	0.200	1.000
R&D Intensity	R&D spending as percent of sales	3.66	3.469	0	16
Systematic Risk	Beta	0.935	0.415	-0.28	2.53
Firm Growth	Net sales growth rate	7.490	13.818	-44.86	73.34
Leverage	Debt-to-equity ratio	185.598	432.652	-3118.67	3560.10
Firm Size	Natural log of total assets	53587806	60745210	258778	437006000
Firm Value, q	Ratio of the sum of the market value of common equity, the book value of preferred stock, the book value of long-term debt, and the book value of short-term liabilities minus the book value of short-term assets to the book value of total assets	0.848	0.974	-0.728	5.252
Firm Value, MTB	Ratio of the sum of the market value of common equity, the book value of liabilities, and the book value of preferred stock to the book value of the firm's total assets	1.669	0.907	0.685	5.916

Table 3 presents a comparison of means and standard deviations of the variables studied across the three triad regions. With the exception of corporate focus and systematic risk, all variables studied show significant differences across regions. As noted earlier, we use the foreign assets ratio (foreign assets/total assets), foreign sales ratio (foreign sales/total sales), and foreign employment ratio (foreign employees/total employees) to operationalize multinational operations. The TN

Index equals the average of the foreign sales ratio, foreign assets ratio, and foreign employment ratio.

Table 3. Comparison of Means across the Triad Regions

Variable	Mean (Standard Deviation)			F Statistics and Significance for Difference in Means
	North American Firms	Continental European Firms	Japanese Firms	
TN Index	46.846 (18.512)	62.261 (16.962)	36.073 (13.884)	58.110***
Foreign Sales Ratio	0.483 (0.219)	0.692 (0.182)	0.432 (0.182)	49.754***
Foreign Assets Ratio ^A	0.468 (0.200)	0.609 (0.184)	0.300 (0.125)	48.627***
Foreign Employment Ratio ^B	0.466 (0.176)	0.585 (0.211)	0.360 (0.151)	23.896***
Corporate Focus	0.605 (0.225)	0.630 (0.296)	0.656 (0.170)	0.955
R&D Intensity	3.14 (3.252)	4.42 (3.849)	3.20 (2.916)	4.829***
Systematic Risk	0.870 (0.362)	0.959 (0.478)	0.987 (0.369)	2.091*
Firm Growth	9.736 (15.114)	9.183 (14.161)	1.595 (8.934)	9.532***
Leverage	151.346 (186.932)	55.191 (318.331)	440.846 (672.843)	21.032***
Firm Size	17.557 (0.943)	17.215 (0.747)	17.380 (1.481)	2.996**
Firm Value, q	1.531 (1.179)	0.581 (0.637)	0.291 (0.301)	59.48***
Firm Value, MTB	2.211 (1.199)	1.475 (0.549)	1.198 (0.272)	39.877***
Number of Firms	106	117	74	

Notes: ***, **, and * identify significance at the 1%, 5%, and 10% levels, respectively. ^A Due to missing values, this variable's sample sizes are reduced to 97 (North America), 74 (Continental Europe), and 58 (Japan). ^B Due to missing values, this variable's sample sizes are reduced to 74 (North America), 96 (Continental Europe), and 47 (Japan).

The average foreign sales ratio for our total sample is 55.3%, with 48.3% for North American firms, 69.2% for Continental European firms, and 43.2% for Japanese firms. The average foreign assets ratio for our total sample is 47.1%, with 46.8% for North American firms, 60.9% for Continental European firms, and 30.0% for Japanese firms. The average foreign employment ratio for our total sample is 49.6%, with 46.6% for North American firms, 58.5% for Continental European firms, and 36.0% for Japanese firms. The TN Index for each firm confirms the multinationality trends from the three ratios detailed above, showing the average Continental European firm being more globally diversified than those within the North American and Japanese economies, with an index of 62.26 for Continental Europe, 46.85 for North America, 36.07 for Japan, and 50.23 for the entire sample.

The main results of this study are reported in Tables 4 through 7 (and subsequently summarized in Table 8). They report the regression results for the parameters for multinational operations, as estimated with the TN Index, foreign sales ratio, foreign assets ratio, and foreign employment ratio, respectively. Firm value is measured as *q* in equations I, III and V and MTB in equations II, IV and VI. Reported are the standardized coefficients for each of the variables and their corresponding *t*-values in parentheses; throughout the tables ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The coefficients for industry and year dummies included in the equation are not reported.

Table 4. Regression Results of Firm Value and Multinational Operations (TN Index)

Variable	North America		Continental Europe		Japan	
	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:
	q (I)	MTB (II)	q (III)	MTB (IV)	q (V)	MTB (IV)
TN Index	-0.199*** (-2.442)	-0.182** (-2.165)	0.201** (2.365)	0.189** (1.998)	0.345*** (2.891)	0.373*** (2.826)
Corporate Focus	0.004 (0.048)	-0.016 (-0.204)	-0.018 (-0.218)	-0.026 (-0.287)	0.003 (0.031)	-0.122 (-1.144)
R&D Intensity	0.074 (0.653)	0.142 (1.214)	0.166 (1.308)	0.404*** (2.871)	0.055 (0.294)	0.123 (0.593)
Systematic Risk	-0.052 (-0.686)	-0.029 (-0.373)	-0.062 (-0.796)	-0.123 (-1.411)	0.270* (1.791)	0.217 (1.307)
Firm Growth	-0.005 (-0.071)	-0.004 (-0.054)	0.140* (1.807)	0.208*** (2.421)	0.114 (0.870)	0.145 (1.002)
Leverage	-0.534*** (-3.798)	-0.595*** (-4.109)	0.091 (1.246)	0.089 (1.099)	-0.236* (-1.602)	-0.257* (-1.582)
Firm Size	0.342*** (2.889)	0.359*** (2.948)	0.005 (0.063)	0.058 (0.604)	0.220* (1.712)	0.062 (0.437)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Yearly Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	-5.054* (-1.885)	-5.017* (-1.786)	-0.463 (-0.316)	-0.285 (-0.204)	-1.149** (-2.398)	0.546 (1.137)
N	105	105	116	116	73	73
Adj. R ²	0.623	0.600	0.580	0.483	0.437	0.314
F-value	9.684	8.890	8.637	6.158	5.053	3.381

Table 5. Regression Results of Firm Value and Multinational Operations (Foreign Sales Ratio)

Variable	North America		Continental Europe		Japan	
	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:
	q (I)	MTB (II)	q (III)	MTB (IV)	q (V)	MTB (IV)
Foreign Sales Ratio	-0.173 ** (-2.183)	-0.162 ** (-1.988)	0.133 * (1.714)	0.114 (1.327)	0.367 *** (2.900)	0.373 *** (2.631)
Corporate Focus	0.011 (0.138)	-0.009 (-0.107)	-0.017 (-0.205)	-0.024 (-0.256)	0.015 (0.152)	-0.108 (-1.004)
R&D Intensity	0.099 (0.856)	0.166 (1.399)	0.206 * (1.582)	0.444 *** (3.084)	0.148 (0.787)	0.213 (1.011)
Systematic Risk	-0.050 (-0.654)	-0.027 (-0.339)	-0.071 (-0.897)	-0.131 * (-1.488)	0.219 (1.427)	0.187 (1.089)
Firm Growth	0.002 (0.029)	0.003 (0.038)	0.140 * (1.771)	0.210 *** (2.393)	0.114 (0.882)	0.157 (1.088)
Leverage	-0.524 *** (-3.688)	-0.586 *** (-4.011)	0.102 (1.377)	0.099 (1.209)	-0.177 (-1.172)	-0.209 (-1.236)
Firm Size	0.345 *** (2.878)	0.360 *** (2.927)	-0.011 (-0.122)	0.042 (0.435)	0.213 * (1.644)	0.049 (0.337)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Yearly Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	-5.275 * (-1.951)	-5.197 * (-1.840)	-0.140 (-0.095)	-0.003 (-0.002)	-1.159 ** (-2.338)	0.553 (1.098)
N	104	104	115	115	72	72
Adj. R ²	0.618	0.597	0.570	0.472	0.445	0.305
F-value	9.422	8.714	8.271	5.889	5.121	3.256

Table 6. Regression Results of Firm Value and Multinational Operations (Foreign Assets Ratio)

Variable	North America		Continental Europe		Japan	
	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:
	q (I)	MTB (II)	q (III)	MTB (IV)	q (V)	MTB (IV)
Foreign Assets Ratio	-0.164* (-1.864)	-0.140* (-1.531)	0.294*** (3.213)	0.303*** (2.828)	0.521*** (3.234)	0.561*** (3.124)
Corporate Focus	-0.005 (-0.065)	-0.022 (-0.266)	-0.084 (-0.816)	-0.113 (-0.945)	0.040 (0.395)	-0.091 (-0.817)
R&D Intensity	0.004 (0.035)	0.080 (0.627)	0.435*** (2.933)	0.610*** (3.510)	0.021 (0.100)	0.125 (0.531)
Systematic Risk	-0.045 (-0.562)	-0.024 (-0.281)	-0.090 (-0.916)	-0.123 (-1.078)	0.163 (0.928)	0.131 (0.668)
Firm Growth	-0.013 (-0.188)	-0.014 (-0.190)	0.191** (2.167)	0.250*** (2.424)	0.091 (0.651)	0.152 (0.975)
Leverage	-0.499*** (-3.430)	-0.552*** (-3.667)	0.041 (0.459)	0.040 (0.383)	-0.216 (-1.459)	-0.287* (-1.739)
Firm Size	0.305*** (2.465)	0.331*** (2.579)	-0.075 (-0.760)	0.004 (0.037)	0.357** (2.026)	0.142 (0.726)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Yearly Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	-4.368 (-1.508)	-4.547 (-1.495)	0.999 (0.547)	0.759 (0.410)	-1.333** (-2.377)	0.434 (0.823)
N	96	96	73	73	57	57
Adj. R ²	0.631	0.605	0.683	0.566	0.530	0.417
F-value	9.198	8.338	9.294	6.021	5.596	3.913

Table 7. Regression Results of Firm Value and Multinational Operations (Foreign Employee Ratio)

Variable	North America		Continental Europe		Japan	
	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:
	q (I)	MTB (II)	q (III)	MTB (IV)	q (V)	MTB (IV)
Foreign Employment Ratio	0.009 (0.082)	0.039 (0.366)	0.208** (2.007)	0.190* (1.643)	0.187 (1.377)	0.218 (1.446)
Corporate Focus	-0.047 (-0.458)	-0.066 (-0.628)	0.042 (0.480)	0.046 (0.468)	0.052 (0.408)	-0.115 (-0.809)
R&D Intensity	-0.054 (-0.326)	0.020 (0.122)	0.231* (1.621)	0.434*** (2.731)	-0.058 (-0.253)	-0.010 (-0.037)
Systematic Risk	-0.057 (-0.560)	-0.037 (-0.362)	-0.147* (-1.747)	-0.220** (-2.344)	0.355** (2.018)	0.320* (1.631)
Firm Growth	-0.166* (-1.759)	-0.175* (-1.818)	0.128* (1.555)	0.183** (1.993)	0.172 (1.461)	0.168 (1.286)
Leverage	-0.481*** (-2.637)	-0.520*** (-2.791)	0.137* (1.715)	0.145* (1.635)	-0.405* (-1.724)	-0.285 (-1.089)
Firm Size	0.232 (1.279)	0.240 (1.299)	0.048 (0.487)	0.077 (0.707)	0.209 (1.281)	0.043 (0.234)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Yearly Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Intercept	-2.602 (-0.693)	-2.413 (-0.616)	-1.141 (-0.700)	-0.553 (-0.348)	-0.907* (-1.872)	0.750* (1.499)
N	73	73	95	95	46	46
Adj. R ²	0.612	0.596	0.607	0.511	0.596	0.498
F-value	6.755	6.380	7.990	5.734	5.840	4.264

Table 8. Summary of Findings

Variable	North America		Continental Europe		Japan	
	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:	Dep. Var.:
	q (I)	MTB (II)	q (III)	MTB (IV)	q (V)	MTB (IV)
TN Index	Discount ***	Discount **	Premium **	Premium **	Premium ***	Premium ***
Foreign Sales Ratio	Discount **	Discount **	Premium *	Premium <i>ns</i>	Premium <i>ns</i>	Premium ***
Foreign Assets Ratio	Discount *	Discount *	Premium ***	Premium ***	Premium ***	Premium ***
Foreign Employment Ratio	Premium <i>ns</i>	Premium <i>ns</i>	Premium **	Premium *	Premium <i>ns</i>	Premium <i>ns</i>

Notes: *ns* indicates statistically non-significant results.

For firms based in North America, the results show a decrease in firm value as the level of global diversification increases for the TN Index, foreign sales ratio, and foreign assets ratio. These results are in line with the results obtained by previous studies (e.g., Denis et al., 2002, and Christophe and Pfeiffer, 2002), which found a decrease in value for multinational operations using a sample of U.S.-based firms. The opposite effect occurs when analyzing the Continental European and Japanese economies, where firm value increases as global diversification increases. The behavior of Continental European and Japanese firms is more consistent with studies reporting a positive relationship between firm value and multinational operations (e.g., Mishra and Gobeli, 1998, and Morck and Yeung, 1991), although these studies analyzed U.S.-based firms only.

As seen in Table 7, foreign employment ratio had a statistically significant positive relationship for Continental Europe firms, while this ratio was not significant for firms from North America and Japan. This differing influence between the North American and Japanese firms versus the Continental European firms could be due to the lack of flexibility in high cost labor markets of Europe. While this assertion is outside the scope of the study, it could be the case that shareholders see greater benefits to firms using labor which is cheaper and more flexibly deployed relative to their home markets.

The data also show that different control variables have an impact on firm value across the three economies. For the North American and Japanese economies, a firm's leverage and size have significant relationships with firm value. In contrast, for the Continental European firms, the variables that show significant relationships are R&D intensity and firm growth rate. These results highlight an interesting aside, warranting future research evaluating the reasons for the differences in the key variables between the three triad regions.

Comparing the model outputs for the two measures for firm value, q and MTB, we see that the results are near mirror images of each other. A small number of coefficients have alternating signs, but without significant results. The only change of note occurred in the TN Index model for Continental Europe, where the variable R&D intensity is significant (at the 10% level) when MTB was the dependent variable, while this is not the case with q as the dependent variable. Since this phenomenon does not repeat itself in other regions or multinationality models within the study, we should not consider this result as having any value. In many ways, q and MTB prove to be close proxies of one another and provide the validity characteristics desired using this triangulation technique. This comes as no surprise, since the calculation of the two measures is quite similar and has been commonly used in the literature to measure firm value interchangeably (as reported in Table 1).

5. Conclusion

This study makes two important contributions to the literature on the relationship between firm value and multinational operations. First, it tests the influence of multinational operations on firm value using a new multidimensional

measure as suggested by many previous researchers on this topic (e.g., Errunza and Senbet, 1984, and Pantzalis, 2001). The robust findings of this measure and convergent validity with previous operationalization of multinational operations should encourage other scholars to use this variable in subsequent research projects.

Second, this study highlights the importance of the location of the firm in determining the relationship between multinational operations and firm value. Findings indicate a positive relationship between multinational operations and firm value for non-U.S. firms (i.e., Continental European and Japanese firms) as argued by the MNH reviewed earlier. Yet this hypothesis does not hold true in the case of U.S. firms, indicating that market valuation of multinational operations is contingent on the environment in which the firm is based. As argued by Denis et al. (2002), it could be that, since U.S. firms are located in the largest singular consumer market in terms of size, the market does not encourage the additional complexity and risk incurred by international operations, leading to a reduction in firm value. This is not the case for Continental European and Japanese firms, which are located in much smaller home markets that require them to internationalize.

While the findings of this study may seem new in some ways, they are consistent with many emerging findings in the literature (e.g., Pantzalis, 2001), which report the geographic location of multinational operations to be a factor influencing firm value. The opposing effect seen by European and Japanese firms compared to North American firms provides an interesting avenue for further research. Also of interest for future research is to replicate the reported findings with medium and smaller sized firms compared to the sample used in this study.

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