

The Value of Corporate International Diversification

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The value of corporate international diversification

Abstract

This paper measures the market value impact of corporate international diversification on a sample of over 28,000 firm-year observations of U.S. corporations from 1984 - 1998. Consistent with most theoretical predictions of foreign direct investment, we find that internationally diversified firms are more highly valued by the market across a series of measures. We identify a value premium to corporate international diversification of 1.4%. This premium is positively related to the breadth of the multinational network and varies over time with the level of the exchange rate. We demonstrate this premium is sensitive to test design and show that differences in the controls for firm size are responsible for the difference between our results and other papers suggesting a significant discount to international diversification.

JEL Classification: F3, G3

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1. Introduction

The issue of the value impact of corporate diversification has been the focus of significant research attention over the past decade. The vast majority of this research has focused on the issue of cross-industry investments. Given this attention, one might believe that industrial diversification is quite common among US firms. This turns out not to be the case, as the more common corporate diversification investment strategy of US firms is to invest internationally, outside of the domestic market. In the late 1990s, the percentage of US firms with cross-border investments was nearly three times the percentage of firms with cross-industry investments.¹ While there is a wealth of well developed economic arguments suggesting that internationally diversifying investments can have important value impacts on firms, the measurement of such impacts has received little attention. In contrast to the long list of studies on the value impact of industrial diversification, there is limited work and mixed results on the value implications of international diversification.

Early work on the value of international corporate diversification looked at return and risk measures and produced mixed results (see, e.g., Mikhail and Shawky (1979) and Brewer (1981)), while value based studies suggested that the value of multinational firms was increasing in the degree of international diversification (see, e.g., Eruzza and Senbet (1981, 1984)). Event studies on the announcement effect of international investments provided weak evidence in favor of a positive influence (see, e.g., Doukas and Travlos (1988) and Markides and Ittner, (1994)). In one of the first direct comparisons of domestic and multinational firms, Morck and Yeung (1991) argued that international investments are responsible for a small value premium but it was conditional on the use of intangible assets. Studies on US firms using Tobin's q as the value measure suggest that international diversification results in a destruction of value on the order of 6-17% (see, e.g., Christophe (1997) and Click and Harrison (2000)). Recent studies using the methodologies developed in the industrial diversification literature present conflicting results. Bodnar, Tang, and Weintrop (1997) (BTW) report a

¹ Denis, Denis and Yost (2002).

positive value impact to international diversification while the most recent study, Denis, Denis and Yost (2002) (DDY), examine the value implications of global operations and report that international diversification is associated with an average value discount of 18% and more. The lack of a consensus in this area is disturbing given the growing importance of international activities to US firms, and underlies the need for further examination of the issue.

In this paper we investigate the value impact of international diversification for a sample of over 6,000 U.S. firms over the period 1984 – 1998 using a variety of techniques in a framework that controls for the firm's industrial diversification as well as other corporate characteristics that influence firm value. Initially, we compare value differences across diversification classes for several common relative value measures. For all of these measures, we find that international diversification is associated with significantly higher values. As our primary value measure, we compute an industrial structure adjusted value measure similar to the one developed by Berger and Ofek (1995) and commonly used in other studies, including DDY (2002). Comparisons of this measure across diversification classes produce similar results to those found with the simple measures. This suggests that any difference in value is not driven by an industry effect.

To more directly determine the valuation impact associated with diversification, we use a multivariate regression to control for other firm-specific characteristics that could influence firm value. Our regression suggests that the value impact of corporate international diversification is positive and significant at 1.4% of benchmark domestic firm value. We also look at the estimates of the value of international operations on a year-by-year basis across the sample period. It is apparent that the value of international operations is related to the value of the US dollar (consistent with Christophe (1997)). In the first three years of the sample, when the US dollar was strong, the value impact of international operations is negative, but for the remaining twelve years of the sample the value impact of international operations is positive (with the exception of 1991). Cross-sectionally, the mean of the fifteen annual estimates of the value impact of international investments is positive, but not significantly difference from

zero. Taken together these results suggest that the overall impact of international operations on firm value is positive, but marginal, and conditional on the strength of the US dollar.

Finally, we present evidence on the economic determinants of the value impacts of international diversification. We find that the value of corporate international diversification is increasing in the degree (breadth) of diversification, but that the industrial diversification effect is not related to the number of the firm's different activities. We also find results suggesting the beneficial impact of international diversification arise partially from a significantly stronger association between profitability and value, and capital expenditures and value for multinational firms. This result is consistent with the findings of Bodnar and Weintrop (1997) where they present evidence consistent with the market perceiving foreign operations offering greater growth opportunities to U.S. firms than domestic operations.

An interesting feature of these results is the extent to which they contrast with existing findings on the value of corporate international diversification. As mentioned above, DDY (2002) report a global diversification discount of nearly 20% and a multiple diversification discount of more than 30%, despite using a similar technique to construct the value measure and using virtually the same sample of US firms (1984-1997). Such differences in results are startling as they lead to different conclusions about the importance of the various theoretical arguments about the cross-border investment on firm value. We investigate this difference and trace its source to two main methodological issues regarding the treatment of firm size. First, there is the decision of a minimum size in order to be included in the analysis. Differences in the choice of this threshold, from \$20M to \$100M in sales, substantially alter the results on the value of international diversification. This is because the smallest firms are almost all domestic and can have different valuation ratios due to greater option-like features of their equity. As a result, the inclusion of very small firms in the benchmark sample distorts the relative valuation measures for the larger multinational firms. Second, we show that the coefficient on the international diversification variable is significantly affected by the definition of the firm size control variable in the regression. The use of a market value measure as a size control variable, given its natural correlation with the dependent

variable, shifts the diversification coefficients substantially downward in contrast to the use of sales or the omission of a size control variable altogether. We demonstrate that differences in these two methodological choices explain the almost the difference between our results and those of DDY (2002).

The rest of the paper is organized as follows. Section 2 reviews the theory and value implications of geographic diversification and briefly summarizes the literature on industrial diversification. Section 3 discusses the sample selection and data sources. Section 4 considers the empirical tests of the value effects of geographic and industrial diversification using conventional market valuation measures. Section 5 constructs an industry-adjusted value measure that controls for possible industry and industrial composition effects and considers the value differences across groups using this measure. Section 6 outlines our tests to isolate the value impact of diversification from measurement problems and self-selection problems. Section 7 investigates the sources of the value effect. Section 8 examines the source of the differences between our findings and those of other studies and Section 9 summarizes and concludes.

2. Theory and Literature Review of Value Impacts of International Diversification

2.1 Theory on Value Implications of International Diversification.

The concept that international diversification enhances firm value has its roots in the literature on the sources of foreign direct investment (FDI). Firms invest abroad to exploit firm-specific assets, the markets for which are imperfect so that the assets cannot be sold for their internal value (see, e.g., Caves (1971) and Hymer (1976)). The firm internalizes the market imperfections and transfers the assets abroad within an internal market. By internalizing the market imperfections, the firm is able to extract above market returns on its specific assets which, in efficient financial markets, are capitalized into a higher value of the firm. The specific source of the value gains from investing internationally comes from expanding firm-specific assets and the potential economies of scale for the use of these assets. Economies of scale of specific assets such as marketing and research and development suggest that their value to the firm increase with the size of the firm's activities that use these specific assets.

Value creation from international operations can also be created through the operational flexibility associated with a multinational corporate system (Kogut (1983)). In light of the increasing uncertainty of the international environment, an internationally diversified network gives the firm the opportunity to exploit market conditions. For example, a multinational production network allows shifting of production in response to any large-scale changes in relative prices that can occur internationally. This cost structure flexibility helps reduce the average marginal cost of worldwide production relative to that of purely domestic production and results in higher profit margins or greater market share. A similar argument holds for average output prices across foreign markets when demand shocks are not perfectly correlated. Conditional on the costs of creating and maintaining a corporate network that is diversified across international-based uncertainties and the variability of the relative prices, such a network can add additional value to the firm because of ability to exploit a larger variety of market conditions.

In addition to these reasons, a firm with internationally diversifying investments can be more valuable because of its ability to arbitrage institutional restrictions such as tax codes and financial restrictions, both formal and informal (see, e.g., Errunza and Senbet (1981, 84)). Having operations in multiple international locations, the multinational firm creates an additional string of options that it can exercise upon occurrence of particular outcomes, such as the location to declare profits, the appropriate market to concentrate market power, and the low-cost location to raise capital.² For example, differences in taxation across countries give rise to the possibility for the firm to transfer some profits and/or losses within the firm to locations where they are tax advantaged, thus reducing the firm's total tax liability (see, e.g., Hines and Rice (1990)). These enhanced capabilities to make these decisions increase the expected cash flows to internationally diversified firms relative to domestic firms.

Finally, value from corporate international diversification can come from investor preferences.

To an investor, multinational firms represent an internationally diversified portfolio—a claim on a

² The assumption of a value advantage in raising capital implicitly assumes that capital markets are not perfectly integrated (i.e., that the location of a security issue impacts its price).

collection of profit streams from various areas of the world. To the extent that investors value international diversification and direct international diversification by investors is expensive, investors should be willing to pay a premium for shares of multinational firms for providing them this service. This premium will increase the value of the internationally diversified firms relative to that of domestic firms.

To the extent that above noted benefits are available uniquely to internationally diversified firms and cannot be otherwise acquired by investors, the value of the internationally diversified firms should be increased to reflect these benefits. Moreover, the incremental value of the internationally diversified firm should be increasing with the ownership of these benefits such as the dispersion of its functional operations across different regulatory and consumer markets given the volatility of the environment in which it operates (see Kogut and Kulatilaka (1994)).

In contrast to the above arguments, corporate international diversification could also reduce firm value. While shareholders seek value maximization as a goal of corporate decisions, managers' objectives may differ. In particular, managers seek to act in their own self-interest, which at times may be at the expense of shareholders' interests. A large literature has developed discussing the negative value implications of shareholders' difficulties in monitoring the activities of managers.³ These problems increase as the organization becomes more complex. Multinational firms, due to their operations in different locations, are arguably more complex than domestic organizations. Moreover, a common solution to this incentive problem is to give managers equity stakes in their firms. This makes managers concerned about firms' specific risk in addition to systematic risk. As a result managers may favor international diversification because it reduces the firm-specific risks they face, even if it results in lower shareholder value. Thus despite the benefits from above, it is possible that extensive international diversification may have a negative impact on firm value.

³ See, e.g., Jensen and Meckling (1976).

2.2. Empirical Evidence on Value of International Diversification

Early empirical work on the effects of corporate international diversification on the firm generally focused on financial performance rather than value and used relatively small samples. The results of these studies on performance are mixed. For example, Mikhail and Shawky (1979) found multinational firms earn excess returns using Jensen's risk-adjustment measure. Brewer (1981), however, reports no difference between multinationals and purely domestic firms in terms of risk-adjusted performance, while Fatemi (1984) finds no difference in the rates of return to investors for multinational versus domestic firms, except in some sub-samples when the multinational firms under-perform domestic firms. Michel and Shaked (1986) find that multinational firms have inferior risk-adjusted performance when compared to domestic firms.

A related line of research examines the stock-price reaction around foreign acquisitions and the valuation of foreign income. Event studies of foreign acquisitions (e.g., Fatemi (1984), Doukas and Travlos (1988), Morck and Yeung (1992), Markides and Ittner (1994), and Desai, Doukas, and Fatemi (1996)) generally find small positive abnormal returns around the date of an international expansion. The effect is often conditional and small (less than 50 basis points) when compared to other corporate events. While these studies suggest some value benefit to foreign operations, they do not address the fully capitalized value impact of the firm's foreign operations.

Errunza and Senbet (1981, 1984) are the first to recognize that with efficient markets, any benefits/harm of international diversification will be capitalized into the current market value of the firm. Errunza and Senbet (1981) examine a small sample of multinational firms from 1968 – 1977 and find that value increases with the extent of international activity.⁴ Errunza and Senbet (1984) confirm this result on a larger set of multinational firms from 1971-1978, this time controlling for firm size and using different measures of international activity. Kim and Lyn (1986) extend this finding, controlling for

⁴ They also show the relation between excess market value and international involvement is stronger for a subsample characterized by barriers to capital flows compared to the more liberal financial rules of the later part of the sample, suggesting that multinationals are valuable when they provide below market cost diversification services.

advertising expenditures, R&D expenditures, prior sales growth, and industry concentration. While demonstrating that value is increasing with the degree of international investments, these studies are unable to provide an estimate of the value benefit of international diversification relative to domestic firms because the use of only multinational firms.

Morck and Yeung (1991) examine the value impact of international diversification using a sample of both domestic and multinational firms. Using 1,644 firms for the year 1978, they show that international diversification is positively related to Tobin's q (defined as the market value of the firm over the book value of its tangible assets). Their results suggest that even upon controlling for other sources of intangible assets such as R&D and advertising expenditures, q is positively correlated with the number of foreign subsidiaries or countries in which the firm operates.

More recent studies have produced mixed results on the value of international diversification. BTW (1997) examine the value impacts of international diversification for a large sample of US firm, using a variant of method developed by Berger and Ofek (1995) for measuring the industrial diversification discount. Bodnar, Tang, and Weintrop report a positive average value impact to international operations of 2.5% percent over the sample period 1987 – 1993.

In contrast, two studies on the value of international diversification using Tobin's q find remarkably different results. Christophe (1997) examines more than 1,800 U.S. firms for the period from 1978 – 1986 and finds that foreign operations are associated with an average value decrease of 6%, with the effect being larger during years when the US dollar was strongest. Click and Harrison (2000) using data from 1984 – 97 also find a significantly lower value on the equity of internationally diversified firms. They report a discount to firms with international operations that ranges between 8 – 17% of the value of a purely domestic firm.

Most recently, DDY (2002) examine the joint economic effects of global and industrial diversification. For the universe of Compustat firms between 1984 and 1997 they isolate the valuation effects of both industrial and international diversification using a variant of the Berger and Ofek (1995)

technique adapted by BTW (1997). They report large average discounts for both industrial and international diversification. Their estimate of the average discount for a globally diversified firm is nearly 20%, and the estimate of the average discount for a firm that is both industrially and globally diversified is 31%.

Given the variety of results on the value of corporate international diversification, we reconsider the issue of the measurement of this effect. We will look at this not only by analyzing some standard value measures, but also from using the more recent technique of Berger and Ofek (1995). We also propose to discover how this variation in results arises as a result of relatively minor differences in methodological approach.

3. Sample Selection and Data Sources

Our sample selection procedure begins by identifying all firms on COMPUSTAT's Annual Industrial and Full-Coverage files incorporated in the United States and covered by COMPUSTAT's Business Information (CBI) file over the period 1984- 1998.⁵ Initially, we identify a firm's diversification status from the CBI Geographic Segment and Industrial Segment databases. The segmental data are generated as part of the disclosure requirements mandated under the Statement of Financial Accounting Standards No. 14 (Financial Accounting Standards Board 1976). For our purposes, firms that report any revenue, income, or asset data for a non-U.S. segment are treated as being internationally diversified for that year. Firms that report no non-U.S. segment information from this disclosure are initially classified as being domestic firms, despite the possibility that they may have up to 10% of their sales, income, or assets abroad.⁶ To further distinguish internationally diversified firms from those classified as domestic by the SFAS No. 14 data, we utilize the reporting requirements of SEC Regulation §210.4-08(h), General Notes to Financial Statements-Income Tax Expense. This regulation requires firms to make separate disclosures of pre-tax income and current and deferred taxes for U.S. and non-U.S. operations. The

⁵ We require data on earnings, sales, assets, share price, number of shares outstanding at the end of the year, book value of common equity, total liabilities, and assets. Incorporation in the U.S. is determined by a zero value for the FINC variable in Compustat.

⁶ We consider the possible impact of this classification error given the reporting requirements of SFAS No. 14 in a later test.

disclosure is mandated if any of the three measures (pre-tax income, current and deferred taxes) for non-U.S. operations exceed 5% of the consolidated total. Thus, this measure allows us to identify firms with smaller foreign operations than the SFAS No. 14 disclosure.⁷ We determine industrially diversified firms as those that report activities in more than one SIC code industry. Initially, we use this information to create a dummy indicator for international (and industrial) diversification, and later will also use the actual number of reported segments as a measure of the breadth of diversification.⁸

To produce a reasonable benchmark of non diversified domestic firms against which to compare the value measures of diversified firms, we delete all firm-year observations with total sales of less than \$40 million.⁹ This leaves us with a sample of 6,217 firms and 28,630 firm-year observations over the period 1984–1998 to conduct our tests. Segmenting the observations by both forms of diversification results in four separate groups: single activity domestic firms, single activity multinational firms, multi-activity domestic firms, and multi-activity multinational firms. Descriptive statistics for these four groups are displayed in Table 1.

The domestic single activity group contains 3,061 unique firms generating 13,611 firm-year observations (49% of the sample).¹⁰ This group acts as the benchmark for all of the value measures. Despite the \$40M cutoff on sales, these firms are small compared to the other groups, in the sample measured on assets, sales, or capital. The second group consists of 1,995 internationally diversified single activity firms generating 9,760 firm-year observations (32% of the sample). On average, these firms have 22.6% of their sales from abroad and report activities in an average of 3.82 different foreign locations.¹¹

⁷ For a complete discussion of the regulation, we refer the reader to Bodnar and Weintrop (1997) pp. 74-75.

⁸ COMPUSTAT arbitrarily restricts the number of foreign segments that it reports to four plus a sum of the total foreign information. Thus, there may be an aggregation of segment of data on the tape beyond that observed in the firms reporting under FASB No. 14. In addition, COMPUSTAT only provides codes for 10 foreign countries with heavy U.S. foreign investment. Consequently, this count of the combination of regions and country codes as a measure of the extent of geographic diversification should be interpreted with some caution.

⁹ DDY (2002) and Berger and Ofek (1995) use \$20 million as their cutoff. We discuss the empirical effects of this choice in section 8.

¹⁰ Note that the sum of these firm numbers exceed the total number of firms in our sample as these figures double count firms that move between classifications over time.

¹¹ Recall that these numbers are the sum of Compustat's pre-determined regions and selected countries for which the firm reports data.

As a group, they are also about 40% larger than the domestic single-activity firms along all size dimensions. The third group consists of 729 internationally diversified firms operating in multiple industries generating 3,702 firm-year observations (12% of the sample). On average, these firms have just under 22% of their sales abroad and report activities in 4.92 foreign locations and 2.86 industrial segments. These firms are the largest in the entire sample along all dimensions, with both mean and median size measures 3 – 4 times larger than the internationally diversified single activity firms. The final group consists of 432 domestic firms that operate in multiple industries generating 1,557 firm-year observations (7% of the sample). These firms report activities in a mean of 2.48 different 4-digit SIC code industries. They tend to be more than twice as large as the benchmark firms in all dimensions, but only about half the size of the internationally diversified multi-activity firms.

4. Empirical Investigation of the Value of Diversification

4.1. Common Value Measures

To measure the value impacts of corporate international diversification, we begin with three standard value measures. The first measure is an excess value ratio, denoted EV, measured as the market value of common equity minus the book value of common equity divided by total sales.¹² This is the value measure used in the studies of Errunza and Senbet (1981, 1984) and Kim and Lyn (1986). Our second measure is a market-to-book ratio, denoted MTB, measured as the total market value of assets to the book value of assets for the firm. The market value of assets is defined as the sum of the market value of equity plus the book value of liabilities and preferred stock. This measure is a close proxy for Tobin's q, which is the value measure used in the studies by Morck and Yeung (1991) and Lang and Stulz (1994).¹³ The final measure is the standard price to earnings per share ratio and is denoted PE.

¹² All the market value measures are based upon prices as of the end of the calendar year. While this can create a distortion due to mis-timing between market values and accounting data (for those firms with non-December 31 fiscal year-ends) it insures that all firms' market values are comparably measured. Fortunately, this choice matters little as using fiscal-year end market values results in virtually identical results.

¹³ This measure differs from a true measure of Tobin's q in that it uses book values for liabilities and normalizes by the book value of tangible assets. Tobin's q generally involves estimating both the market value of a firm's liabilities as well as the market value (replacement cost) of the tangible assets. Morck and Yeung (1991) report that they obtain very similar results to those reported in their study when they use a simple market-to-book ratio instead of their measure of Tobin's q.

4.2. Results

Table 2 displays the summary statistics for all three measures across the four groups of firms. In Panel A we report the findings for the excess value measure, EV, in Panel B we report the results for the market to book value of assets, MTB, and in Panel C we report the results for the PE measure. To test the value impact of international diversification we compare the values measures for the internationally diversified firms to their comparable domestic counterparts, segmented by whether the firms are single activity or multiactivity. Because of the large degree of skewness in the distributions, the primary statistical tests are Z-scores (for both the median test and the Wilcoxon test), which are distributed as unit normal distributions under the standard null hypothesis. For completeness, we also report a 2-sample t-test for the means though it will be biased due to the skewness.

In looking across the Panels of Table 2, the results for all three of these common value measures are similar. The internationally diversified firms have significantly higher medians than the comparable (focused or multiactivity) domestic firms and there is a statistically significant positive difference between the two distributions. The differences are most significant when comparing between the two groups of single activity firms, and are always significant at the one percent level, even between the two groups of multiactivity firms. For example, the median excess value measures in Panel A are 0.239 and 0.433 for the single-activity domestic and the single-activity internationally diversified firms, respectively; and 0.182 and 0.303 for multiactivity domestic and multiactivity internationally diversified firms, respectively. The z-scores for test of differences between medians are 21.990 and 8.659 for single activity and multiactivity firms, respectively. These scores indicate that internationally diversified firms have significantly higher median excess value to sales ratio than domestic firms in their comparable industrial diversification categories. The means of the value measures are also always larger for the internationally diversified firms, but they are not always statistically so. This pattern holds regardless of whether we measure market value relative to book value of equity, book value of assets, or even earnings, suggesting that it is not dependent on the manner in which the value ratio is calculated. The implication

of this table is that firms that are diversified internationally are more highly valued by the market than domestic firms.

Of course, an important limitation to the results presented in this table is that we do not control for industry influences across the different groups of firms. It could be that firms in activities with naturally higher (lower) value measures are more likely to be internationally diversified (domestic). To measure the value impact of international diversification in fashion that controls for the effects of industry, we need to produce an alternative value measure and adjust for the impact both of the inherent differences in value ratios across industrial activities and the potential mix of industrial activities within the multiactivity firms.

5. Adjusted-Value Measure

In this section we create an adjusted-value measure, whereby the market value of each firm is compared to an imputed market value of firm's industrial segments. We use the modification to Berger and Ofek (1995) offered in BTW (1997) and also used in DDY (2002) in which single industry domestic firms are used as the benchmark for an imputed value measure of all diversified firms. To allow for benchmarking against single-activity domestic firms, the imputed value for each industrial segment of industrial and internationally diversified firms is based upon the industry median market-to-sales ratios of single-activity domestic firms (for full details on this measure see the Appendix).

5.1. Constructing the Adjusted Value Measure

To calculate this adjusted-value measure, we require each firm-year observation to have data on total market value (defined as the sum of the market value of common equity plus the book value of liabilities) and industrial segment sales data that reconciles with total sales (the sum of segment sales must be within ± 1 percent of consolidated sales).¹⁴ The imputed value of a firm's activity in a particular

¹⁴ For data reasons, sales are the best segment information to form cross-firm comparisons. Under SFAS No. 14, segment sales are required to be fully allocated on both an industrial and geographic basis. The same is not true for segment assets, where firms often report a large common (corporate) allocation. Segment income suffers from the same problems in addition to the fact that firms can use transfer pricing to distort segment income for tax or informational purposes.

industry is determined from the median market value-to-sales ratio for all domestic single-activity firms in that particular industry for that particular year.¹⁵ In obtaining the multiplier for a particular industry, we use the narrowest SIC code grouping that includes at least five domestic single activity firms in that industry for that year. We restrict the sample to firms that report at least \$40M in sales in order to have a sample of domestic firms that is roughly comparable in terms of size to the diversified firms. Using this algorithm, 37 percent of the industrial multiples are taken from 4-digit SIC groupings, 22 percent from 3-digit SIC groupings, and the remaining from 2-digit SIC groupings.

The representative industry multiplier for each year is applied to each firm's annual reported sales in that industry for that year to create the imputed market value for that activity. For single activity firms, this result becomes the imputed value of the firm. For multi-activity firms, the imputed value of each industrial segment is summed to generate a total imputed value of the firm. By definition, this imputed value represents an estimate of the value of the firm if all of its activities were valued as stand-alone domestic firms. The natural logarithm of the ratio of the firm's total market value to this imputed value, denoted VM, is our adjusted-value measure. When this ratio is positive, it indicates the firm, if single activity, is more valuable than the median domestic firm in that industry adjusted for the level of sales. If the firm is multi-activity, a positive ratio indicates that the firm is more valuable than the portfolio of representative domestic firms in the same industries with comparable sales levels. When this ratio is less than zero, the firm is less valuable than its comparable domestic benchmark(s).¹⁶

5.2. Results

Table 3 displays the summary statistics for the distribution of our adjusted-value measure for each of our four groups of firms. We report the mean and three quartiles of these distributions. By construction, the median value measure for the domestic single activity firms is zero. The mean for these

¹⁵ The decision to develop an annual benchmark is different from BTW (1997). The overall results are substantially the same, but the annual benchmark allows for a more direct comparison to DDY (2002).

¹⁶ For a discussion of potential benefits and drawbacks to this approach, see Berger and Ofek (1995). The important difference between their methodology and the one used here is that we use the single-activity domestic firms to draw the multipliers whereas they use all single segment firms. Approximately one-third of the single activity firms have international operations (and therefore potentially higher value).

firms is slightly positive, 0.003 and significant at the 1 percent level suggesting a slight positive skewness to the distribution. As in Table 2, we conduct three statistical tests to compare the distributions of the value measures: a median test, a Wilcoxon test for entire distribution, and a two-sample t-test of the means.

Focusing first on the internationally diversified firms operating in a single industry, we see a median adjusted-value measure of 0.035 and a mean adjusted-value measure of 0.044. Both of these values are significantly different from zero and higher than those of single-activity domestic firms. The differences with respect to the single-activity domestic firms suggest that, within an industry, the typical firm that is internationally diversified is approximately four percent more valuable than the typical domestic firm. The Wilcoxon test, $Z = 6.195$, indicates that value measures for the internationally diversified firms are significantly shifted in the positive direction throughout the entire distribution. This suggests that even upon controlling for industry, international diversification adds value to firms.

A similar pattern appears for the multiactivity firms. Given the adjusted value measure, each firm's market value is compared to the value of a similarly weighted industrial portfolio of single activity domestic firms. Looking at the domestic multiactivity firms, we see the evidence of the industrial diversification discount documented by others, though our median estimate, -0.029, as well as our mean estimate, -0.037, are substantially smaller than the original estimates in the literature (see, e.g., Berger and Ofek (1995)). In contrast, we note that the internationally diversified multiactivity firms report both a positive median, 0.017, and mean, 0.027, for their adjusted value measure. This indicates that the median and mean firms in this group are more valuable than their comparable portfolio of domestic single activity firms. The tests statistics for the internationally diversified multiactivity firms compares their distribution of value measures with that of the domestic multiactivity firms. Similar to the single activity firms, the difference in the medians and means indicate four to five percent higher value for the internationally diversified firms. These differences, as well as the differences across the distribution are statistically significant.

These results with the adjusted-value measures reveal the same basic pattern found in Table 2. Consistent with previous studies, industrially diversified firms have significantly lower market value when compared to their single activity domestic counterparts. Furthermore, these results suggest that corporate international diversification has a positive impact on firm value and that the size of this effect is economically significant.

6. Isolating the International Diversification Effect

In this section we seek to further isolate the impact of international diversification from other sources of firm value, in addition to industrial diversification, that are not considered in the previous tests. To do this we use a multivariate regression to control for other value-relevant firm characteristics. We use a series of control variables derived from previous research on both industrial and international diversification. From the international diversification literature, Morck and Yeung (1991) provide a theoretical justification for controlling for R&D and advertising expenditures as proxies for firm specific assets that may lead to economic rents. They also control for leverage as a proxy for any financing benefits of being multinational. From the industrial diversification literature, Berger and Ofek (1995) demonstrate the importance of controlling for measures of profitability, growth opportunities (capital expenditure), and firm size as factors that could affect excess value. This multivariate regression model appears in both BTW (1997) and DDY (2002).

The dependent variable, our adjusted-value measure from the previous section, VM, is a relative measure. We therefore also measure the corporate control variables in relative terms.¹⁷ Thus, for each firm, the corporate control variables are measured as the values for the firm relative to the value of its

¹⁷ The use of a relative measures for accounting variables in the model is not part of the Berger and Ofek (1995) study, but is a modification included by BWT (1997) and DDY (2002).

benchmark firm each year. Thus our multivariate regression is:

$$VM = \alpha_0 + \sum_{i=1985}^{1998} \gamma_i TD_i + \alpha_1 INTDIV + \alpha_2 ACTDIV + \alpha_3 Size + \alpha_4 Leverage + \alpha_5 \frac{EBIT}{Sales} + \alpha_6 \frac{Capex}{Sales} + \alpha_7 \frac{R \& D}{Sales} + \alpha_8 \frac{Advert}{Sales} + \varepsilon_t$$

where:

VM	is the adjusted-value measure derived in the previous section;
TD	is a time dummy equal to one for year i and zero otherwise (omitted for 1984);
INTDIV	is a dummy set equal to one if the firm is internationally diversified and zero otherwise;
ACTDIV	is a dummy equal to one if the firm is industrially diversified and zero otherwise;
Size	is the log of the difference between the firm's total sales and that of its benchmark firm(s);
Leverage	is the difference between the firm's debt/total asset ratio and that of its benchmark firm(s);
EBIT/Sales	is the difference between the ratio of the firm's earnings before interest and taxes to its total sales and that of its benchmark firm(s);
Capex/Sales	is the difference between the firm's capital expenditures to sales ratio and that of its benchmark firm(s);
R&D/Sales	– the difference between the firm's R&D expenditures to sales ratio and that of its benchmark firm(s);
Advert/Sales	is the difference between the firm's advertising expenditures to sales ratio and that of its benchmark firm(s).

Due to the more stringent data requirements for the control variables, the multivariate regression is reduced to 18,553 firm-year observations.

Estimates from the pooled sample regression and the associated White (1980) adjusted standard errors are displayed in Panel A of Table 4. Focusing first on the corporate control variables, the coefficients are generally consistent with intuition and the results of previous studies. High relative profitability (EBIT/Sales), R&D intensity (R&D/Sales), investment opportunities (Capex/Sales) and advertising intensity (Advert/Sales) are all significantly associated with greater value. Both firm size and leverage are positively related to value, but not significantly so.¹⁸ In addition, the dummy variable for industrial diversification is negative and significant, -0.0343. This is consistent, but substantially smaller than estimates of the diversification discount from previous studies (see, e.g., Berger and Ofek, (1995), Lang and Stulz (1994).

¹⁸ This result for firm size is contrary to previous studies and relates to our measurement of firm size. We address the issue of firm size in a separate section.

Controlling for these other influences on value reduces our estimate of the value impact of international diversification relative to Table 3. The estimate of the value impact of international diversification is 0.0140, and statistically significant at the 5% level. This result suggests that, on average, an internationally diversified firm is 1.4% higher value than an otherwise identical domestic firm (i.e., same industrial structure, corporate characteristics and time). The slight reduction in the estimate of the value impact of international diversification relative to Table 3 is consistent with a self-selection issue among internationally diversified firms. It is likely that more successful firms are the ones that consider internationally diversifying investments.

Because of the pooled nature of the data set, there is the possibility that the standard errors may be under-stated due to positive cross-sectional correlation among the residuals. As a control for this potential effect, Panel B of Table 4 reports results for the fifteen year-by-year regressions and the means of the annual coefficient estimates. The means and statistical significance of the annual coefficient estimates for most of the variables are similar to the results reported in Panel A. The important change is for the international diversification variable. The average annual estimate of the international diversification parameter is smaller, 0.004, and is not statistically different from zero. When we look at the annual regressions it is apparent that the estimate of the value of international diversification is strongly negative in the early three years of the sample 1984-1986 and then becomes positive (with the exception of 1991) in the later years 1987-1998, with the larger values in the middle 1990s. This time series pattern results in both a reduction of the equally weighted mean as well as higher standard error of the mean.

The pattern in the annual estimates of the international diversification coefficient appears as though it might bear some relation with the value of the US dollar over the period. This seems plausible in that the market value of foreign operations is predicted to, and has been shown to, be influenced by the

exchange rate (see, e.g., Marston (2000) and Bodnar and Gentry, (1993)).¹⁹ To investigate whether our estimate of value of international diversification is related to the value of the US dollar, we regress the 15 annual estimates of the international diversification dummy on the deviation of the end of year US dollar major currency real exchange rate index from the average the average index level over the period.²⁰ The results (not reported in a table) indicate an elasticity between the international diversification value coefficient and the percentage exchange rate deviation of -0.25 , which is statistically significant at the one percent level. The regression has an R-squared of 48%, corresponding to a correlation between the variables of just under -0.70 . The elasticity coefficient indicates that a movement of 10% in the real index value of the US dollar results in a swing in the value of the international diversification coefficient of 0.025, far larger than its unconditional mean. This suggests that measurement of the value of corporate international diversification is dependent on the level of the exchange rate. Such a finding is consistent with Christophe (1997) who reports that his estimates of an international diversification *discount* are positively related to a weighted average foreign currency value of the US dollar.

7. Investigations into Sources of the International Diversification Value Effect

Previous studies on industrial diversification have looked into possible explanations for the industrial diversification discount based upon the correlation of the discount with various firm characteristics. They have shown the discount is related to an over investment in activities with few growth opportunities and/or cross subsidization of loss making segments. In this section we examine possible sources for the international diversification premium we document above using a similar approach. To contrast the sources of the international diversification effect with the industrial diversification effect previously documented, we examine determinants of both effects simultaneously.

¹⁹ Although the exchange rate affects both the US dollar market value of firms with foreign investments (in the numerator of our adjusted value measures) and the dollar value of the foreign sales (in the denominator of our adjusted value measure), it need not be the case that these two effects cancel one another out. Generally we would expect the market value effect to be an impact on all future values while the impact on sales is only for the current year.

²⁰ The exchange rate data is the Real Nominal Major Currency Index of the US dollar and is taken from the Federal Reserve Board website (www.federalreserve.gov).

To do this we use an expanded multivariate regression where we add additional terms consisting of the diversification dummies interacted with the existing corporate control variables plus the a measure of the firm's degree of diversification (number of industrial/international segments) from COMPUSTAT's Business Information databases. For the international diversification premium, we also include a measure of the deviation of the aforementioned exchange rate index away from its sample average. The estimates of the coefficients on the interacted corporate variables allow us to examine possible sources of the diversification effects. The results of the interacted regression over the full sample are displayed in Table 5.

Focusing on the international diversification results, we see that upon controlling for other factors, the unconditional international diversification effect, while positive at 0.010, is not significantly different from zero. This indicates that just having an international operation will not significantly add value to the firm. The coefficient on the interaction of INTDIV (0.0032) with the degree of diversification measure is positive and significant, indicating that the diversification premium is increasing in the breadth of the diversification. This finding is consistent with the importance of the breadth of diversification is consistent with previous studies (see, e.g., Allen and Panzalis (1996)). These results are in contrast to the comparable results for the industrial diversification effect, where the unconditional effect is now large and negative, but the slope of the effect with the degree of diversification is zero. Finally, as we saw in the previous section, the interaction of the international diversification effect with the exchange rate deviation is highly negative and significant, indicating that the value of international diversification is strongly related to the foreign currency value of the US\$.

The interactions of the diversification dummies with the corporate control variables provide some support for an economic interpretation of the international diversification effect, especially in contrast to the determinants of the industrially diversification effect. The international diversification effect is significantly negatively related to relative leverage (-0.1086), but significantly positively related to relative capital expenditures and relative advertising expenditures. This is consistent with the view that

the most valuable internationally diversified firms are those seeking growth in new markets. Such firms will be making more investments in both tangible and intangible assets and as be more likely to be carrying financial slack. Such a view, however, is somewhat contradicted by the large negative coefficient on the interaction of the international diversification indicator and R&D expenditures. This result suggests that international diversification is less valuable to firms that have relatively more R&D expenditures, and contrasts with the finding of Morck and Yeung (1991) that multinationality was only valuable when conditioned on R&D expenditures. Thus we can conclude from this analysis that the international diversification effect is most positive among low leverage firms with high investment across a large number of international locations, and that spend aggressively relative to their domestic counterparts on advertising but not necessarily R&D.

8. Comparison to results in Denis, Denis and Yost (2002)

At first glance, these results offer a different picture of the value impact of corporate international than the results of DDY (2002), despite appearing to use virtually identical data sample and methodology. In contrast to our findings of a small positive impact to corporate international diversification, DDY report a average value impact of international diversification of -18.2% among single activity firms and an average value loss for firms that are both internationally and industrially diversified of -32.2% (See table VI, p.1967). The substantial size of these estimates suggest managers that invest internationally are significantly harming shareholders and could increase firm value in some cases by simply abandoning these investment. In this section, we identify several minor differences in methodology and demonstrate that in some cases they can have significant impacts on the results.

Both studies draw their samples from the universe of firms on the US Compustat database eliminating financial service firms and firms in regulated industries. While DDY (2002) have a sample period of 1984 – 1997, we use 1984 – 1998.²¹ Both papers describe a similar methodology for producing

²¹ The DDY study uses 14 years as opposed to 15 years in the current study. We rerun our tests on the 14 -year time period and essentially obtain similar findings.

the adjusted value measure, the adaptation of the Berger and Ofek (1995) methodology as offered in BTW (1997). Both use basically the same control variables in their regressions.

Upon closer inspection, we identified several minor differences in implementation of this methodology. The first is in the definition of an internationally diversified firm. While DDY use the standard segment disclosure information from the geographic portion of Compustat's business segment database, we supplement this with the additional information from SEC Regulation §210.4-08(h), General Notes to Financial Statements-Income Tax Expense to identify firms that are internationally diversified. Since this the former disclosure has a 10% foreign materiality level for disclosure, the Income Tax Expense data has a 5% foreign materiality level for disclosure. This causes our sample have a slightly higher percentage of firms classified as internationally diversified in the DDY sample. This difference, however, does not turn out to be important in explaining the difference in results, as we found similar results (not reported) when we re-ran out tests omitting the extra classification using the tax footnotes.

A second, and much more important, difference in implementation of the methodology centers around firm size, both in terms of setting a minimum for inclusion on the sample and in defining the size control variable. In the DDY (2002) study, a minimum sales level of \$20M is set for a firm to be included in the sample, while in our approach a minimum sales level is \$40M.²² In addition to having the obvious effect on overall sample size, this difference significantly affects the composition of the domestic single activity firms that act as the benchmark for the adjusted value measure. This is because small firms are, almost by definition, unlikely to be diversified in any dimension and a lower cut-off size results in even larger differences in the mean and median sizes of the diversified firms and benchmark firms. This can be a problem if the valuation to sales ratios that act as the multipliers for the adjusted value measures are systematically related to firm size in a non-linear way. One reason this may be the case is that small firms are generally much more volatile and as a result may derive a larger percentage of their value from

²² The \$20M sales minimum was also used by Berger and Ofek (1995) for a sample in an earlier time period.

the option nature of their equity, leading to inappropriate benchmark market to sales ratios for the larger, less volatile, diversified firms.

The effect of this difference in methodology can be seen in Panel A of Table 6. In this table, we reproduce our results Panel A of Table 4 with a sample that is reconstructed using the \$20M sales minimum used in DDY rather than our \$40M sales minimum. As would be expected, our sample size increases by more than 5,000 observations, most of which are domestic and single activity. More importantly, and consistent with an generalized increase in the benchmark multipliers, the estimates of the value impact of international diversification, as well as industrial diversification, falls by about 3%. It is now a small, but significantly negative value, -0.0195. Further tests, not reported, indicate that the minimum size cutoff for inclusion on the sample has a systematic effect on the results. With our model, the coefficient on the international diversification variable while negative when we use the \$20 million cutoff, but becomes insignificant at the \$30 million level and then increasingly positive and significant for cutoff levels of the \$40, \$50, \$60, \$80, and \$100 million levels. The conclusion one derives about the effect of diversification is then dependent upon what one considers the appropriate benchmark for the diversified firms. Since the segments of multiactivity diversified firms are generally larger than the single segment firms, one could argue that the use of a higher benchmark size provides a better economic match for the diversified firms.²³

While the difference in the minimum size for inclusion in the sample explains some of the difference in the results between this paper and DDY (2002), there is still another significant difference. Most of the remaining difference in results can be explained by the choice of the construction of the size control variable in the multivariate regression. In DDY (2002), the size control variable is measured as the market value of the firm, while we use firm sales for this purpose. While market value of equity is a common measure of firm size in corporate finance studies, in this case the choice is problematic. The dependent variable, VM, is a function of the market value of the firm and thus using relative market value

²³ To the extent a researcher wanted a better match than our current 1:2 size ratio, he would choose a large minimum size and obtain an even more significant positive value impact to international diversification.

as a control variable on the right -hand side of the regression results in a natural positive correlation between these two variables. Given that the distribution of firm size (relative to the benchmark firm) has a long right hand tail and the empirical relation between the adjusted value measure and relative size, which is biased by the positive correlation, is not likely to be linear, the model will tend to over predict the adjusted value measures for the larger firms. The large firms, especially the largest firms, are exactly the firms that are diversified, as there is a natural relation between being in many places or activity and being large. This puts pressure on the diversification dummies to correct for the over prediction of the dependent variable with the result that the diversification dummies, as proxies for large firms will be biased in the negative direction. Such a situation does not occur with sales as a control for firm size as sales does not have as strong a natural correlation with the dependent variable.

To demonstrate the impact of the difference in the definition of the size control variable, Panel B of Table 6 shows reproduces the results for the sample in Panel A (still using the \$20M sales cutoff for inclusion in the sample), but uses relative market value as the size control variable rather than relative firm sales. Note that the coefficient on the size control variable changes from basically zero to 0.1385, and is highly significant, consistent with the story above. The impact of this change on the diversification coefficients is significant. The coefficient on the international diversification dummy drops from -0.0195 to -0.1572, a nearly 16% discount to an average internationally diversified firm. Notice also that the coefficient on the industrial diversification dummy drops from -0.0555 to -0.2039, consistent with the size parameter bias story above. Thus by making two changes to our methodology, we are able to nearly reproduce the results of the DDY(2002) paper suggesting that the value impact of international diversification is on the order of -18% to -20%.²⁴

We argue that our choices with respect to the methodological differences are preferable in that they result in a more comparable set of benchmark form against which to compare values with the

²⁴ The economic justification for including firm size as a control variable is mostly as a catch all for other effects rather than for a clear theoretical relation between firm scale and excess value. As a result, as an additional robustness check, we re-ran our regression in Table 4 omitting firm size as a control variable. The results, not reported, show that the international diversification coefficient was 0.0156 and remained significant at the 5% level.

adjusted value measures. Also, the choice of sales as a firm scale control variable is preferable as it avoids the bias that results from the natural positive correlation between the adjusted variable measure and the firm scale variable measured as market value. These changes completely eliminate the results of the huge discount to international diversification suggested by DDY (2002). This is comforting as the implication of their finding suggests that for the average US internationally diversified firm, with around 22.6% of sales from abroad, foreign investments essentially have zero value. Our results, of a small positive impact, conditional on the exchange rate, are more consistent with the findings of most of the other literature on international diversification and are consistent with the majority of the theory on international diversification.

9. Summary and Conclusions

In this paper, we investigate the value effect of corporate international diversification for a large sample of U.S. firm-year observations over the period 1984 - 1998. Using common measures of relative firm value, such as an excess market value of equity to sales ratio, a market to book ratio for the firm, and a simple price to earnings ratio, we demonstrate that internationally diversified firms have consistently higher value. We then construct an industry adjusted value measure similar to those used in previous diversification studies and confirm our result that this measure is higher for internationally diversified firms, with the median increase in value on the order of 3.5%.

Further analysis that attempts to control for other firm-specific variables that have been demonstrated previously to affect value, such as size, profitability, capital expenditures, R&D, advertising, and leverage, results in a decrease in the size of the value effect of international diversification by about half, to 1.4%. This effect remains positive and statistically significant. Investigations into the determinants of these effects indicate that the international diversification premium is negatively related to the value of the US dollar, but positively related to the breadth of international diversification as well as corporate characteristics consistent with growth opportunities. Lastly, we reconcile our findings with the disparate results in the paper by DDY (2002). We show that the results

from these valuation tests are sensitive to the measurement of the size as a control variable in the multivariate regressions as well as the cutoff for the minimum size firm to be included in sample.

We conclude with the caveat that the results of measuring value can be sensitive to the details of specific assumptions and a variety of methods and measures used to draw conclusions. Together all of our results suggest that international diversification is somewhere between slightly beneficial to marginally indifferent for firm value, rather than highly detrimental as suggested by previous research.

Appendix

The adjusted-value measure we use is similar in nature to the one used in Berger and Ofek (1995). We compute the value measure in the following fashion:

$$\text{Adjusted Value Measure}_{i,t} = \ln \left(\frac{\text{Market Value of Assets}_{i,t}}{\text{Imputed Value of Assets}_{i,t}} \right) \quad (\text{A1})$$

$$\text{Imputed Value of Assets}_{i,t} = \sum_{k=1}^n (SS_{i,t,k} \cdot \gamma_k) \quad (\text{A2})$$

where:

- Market Value of Assets_{i,t} - firm's total capital (market value of common equity plus book value of debt and preferred stocks) for firm i at year t;
- Imputed Value of Assets_{i,t} - sum of imputed value of assets of firm's segments as stand-alone activities;
- SS_{i,t,k} - sales revenue in industry segment k reported by firm i at year t,
- γ_k - median market capitalization to sales ratio for the domestic single activity firms in industry k,
- n - number of industrial segments reported by firm i at year t,
- ln - natural logarithm function.

Equation A1 shows the adjusted-value measure is the natural logarithm of the ratio of the firm's actual value to its imputed value. The firm's imputed value is expressed in equation A2 as the sum of the imputed asset value of each segment. To compute the segment imputed capital value, we multiply an industry median capital-to-sales multiplier for single-activity domestic firms by the segment sales in the same industry reported by the firm. Thus the imputed value of each segment represents the imputed capital of firm's industry segment as if it is a stand-alone single-activity domestic firm. We repeated this process for each of the firm's segments and then sum them to obtain the firm's imputed capital value for the year. We find the firm's adjusted-value measure by taking the natural logarithm of the ratio of actual to imputed value. The measure will have a value of less than zero if the actual value of firm is less than the imputed market capitalization of its segments based upon the median market capital-to-sales ratio of domestic-single-activity firms in each industry. This suggests that a firm is less valuable than the sum of its components on a standalone basis. Similarly, the measure will have a positive value if the actual value of the firm is more than the imputed market value. This suggests that a firm is more valuable than the sum of its components on a stand-alone basis.

Berger and Ofek (1995) obtain their median industry multipliers on a base sample of single-activity firms, which include both domestic and multinational firms. We, on the other hand, compute the industry median multipliers on a base sample of single-activity domestic firms, a subset of those used by Berger and Ofek. Single-activity multinational firms are excluded when we compute the industry median multipliers. This procedural difference is required because we examine the valuation effects of both industrial and international diversification. The single-activity domestic firm is not diversified along any direction. Excluding the single-activity multinational firms when computing the median multipliers helps avoiding a potential bias that would act toward increasing the significance of our test. The positive value effect of international diversification of the single-activity multinational firms has the potential of over-estimating the imputed value for multiple-activity domestic firms while under-estimating the imputed value for the single-activity multinational firms, if the single-activity multinationals are included to compute industry median multipliers.

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Table 1: Descriptive Statistics

This table provides descriptive statistics for the sample of firm year observations used in the study. The sample is derived by taking all firms incorporated in the US with annual sales of over \$40m that have data on both the COMPUSTAT Annual Industrial and Full Coverage files (CAFC) and the COMPUSTAT Business Information File(BIF) for the period 1984 – 1998. Firms with international operations are identified as those reporting information for more than a domestic segment in the (BIF) and/or that report information for foreign pre-tax income and foreign taxes on CACF. All data are from COMPUSTAT.

	Domestic Single Activity Firms			Internationally Diversified Single Activity Firms			Internationally Diversified Multi-Activity Firms			Domestic Multi-Activity Firms		
	Mean		Median	Mean		Median	Mean		Median	Mean		Median
Number of Unique Firms		3,061			1,995			729			432	
Total Firm-year Observations		13,611			9,760			3,702			1,557	
Number of International Segments	1		1	3.82		3	4.92		5	1		1
Number of Industrial Segments	1		1	1		1	2.86		3	2.48		2
Foreign Sales Ratio	-		-	0.226		0.179	0.219		0.190	-		-
Total Sales (\$mil.)	663		151	1,048		215	3,199		1,438	1,957		602
Total Assets (\$mil.)	547		118	917		185	2,901		1,193	1,654		484
Total Market Value (\$mil.)	524		99	1,179		207	3,373		878	1,425		336
Debt to Asset Ratio	0.284		0.257	0.209		0.170	0.266		0.245	0.309		0.283
EBIT on Sales	0.067		0.064	0.081		0.085	0.090		0.085	0.077		0.067
Capital Expenditure on Sales	0.096		0.041	0.077		0.046	0.064		0.049	0.074		0.042
R&D Expenditure on Sales	0.014		0.000	0.057		0.027	0.023		0.014	0.005		0.000
Advertising Expense on Sales	0.015		0.000	0.017		0.000	0.021		0.000	0.011		0.000

Table 2: Univariate Comparisons of Common Value Measures between Domestic and Multinational Firms by Industrial Diversification

The panels show summary statistics for the distributions of common value measures conditional on whether the firm is identified as having international and cross-industry operations. N is the number of firm year observations. Q1, Median, and Q3 are the 25th, 50th and 75th percentiles observation of the distribution. Mean is the equal weighted average of all observations. The last three columns report test statistics comparing the equivalence of the medians (Median test), the entire distribution, (Wilcoxon test) and the means (2 sample t-test) across the two distributions. Panel A for an excess equity value measure (Thomadakis (1977)) defined as the market value of equity less the book value of equity as a ratio to firm sales. Panel B displays results for the market-to-book ratio, defined as the market value of the firm’s assets divided by the book value of the firm’s assets. Panel C displays the results for the price-to-earnings ratio, defined as the price per share divided by the basic earnings per share at the end of the fiscal year.

						Test of Differences			
Firm Classification	N	Q1	Median	Q3	Mean		Median	Distribution	Mean
Panel A : Excess Market Value (Market Value of Equity – Book Value of Equity) / Sales									
Domestic Single Activity Firms	13,611	0.037	0.239	0.714	0.613		Z=21.990	Z=20.113	t=13.86
Internationally Diversified Single Activity Firms	9,760	0.113	0.433	1.085	0.835				
Domestic Multi-Activity Firms	1,557	0.036	0.182	0.565	0.500		Z = 8.659	Z = 7.934	t = 0.77
Internationally Diversified Multi-Activity Firms	3,702	0.107	0.303	0.685	0.523				
Panel B : Market-to-Book Value of Assets									
Domestic Single Activity Firms	13,513	1.084	1.789	2.935	2.610		Z = 13.751	Z = 11.205	t = 1.16
Internationally Diversified Single Activity Firms	9,716	1.271	2.036	3.315	3.335				
Domestic Multi-Activity Firms	1,554	1.137	1.704	2.658	1.836		Z = 4.922	Z= 3.739	t = 0.69
Internationally Diversified Multi-Activity Firms	3,699	1.261	1.860	2.861	2.071				
Panel C : Price-to-Earnings Ratio									
Domestic Single Activity Firms	13,448	7.070	13.793	21.596	18.261		Z = 7.690	Z = 9.856	t = 0.75
Internationally Diversified Single Activity Firms	9,672	8.145	15.240	23.246	19.328				
Domestic Multi-Activity Firms	1,545	8.569	13.590	19.059	17.190		Z = 3.413	Z = 3.122	t = 0.81
Internationally Diversified Multi-Activity Firms	3,683	9.759	14.375	19.712	20.064				

Table 3: Univariate Comparisons of Industry-Adjusted Value Measure for Domestic and Multinational Firms for Given Degree of Cross Industry Diversification

The table provides summary statistics on the distributions of an Adjusted Value Measure conditional on the existence of international operations for firms operating in single and multiple industries. The value measure is adjusted for industry effects and is calculated in a fashion similar to that used by Berger and Ofek (1995). The measure is the natural logarithm of the ratio of a firm's actual total market capitalization to its imputed total capitalization. A firm's imputed total capitalization is equal to the firm's sales in its particular industry multiplied by the median ratio of capitalization to sales among the domestic single activity firms in that industry with sales greater than \$40m. Thus, by definition the median adjusted value measure for the domestic firms in each industry will be zero. N is the number of firm year observations. Q1, Median, and Q3 are the 25th, 50th and 75th percentiles observation of the distribution. Mean is the equal weighted average of all observations. The last three columns report test statistics comparing the equivalence of the medians (Median test), the entire distribution, (Wilcoxon test) and the means (2 sample t-test) across the two distributions. The implicit alternative hypothesis in the test statistics is that the median, distribution or mean for the firms with international operations is more positive than for the firms with domestic operations only.

Adjusted Market Value: $\ln(MV/ \text{Imputed } MV)$						<u>Test of Differences</u>		
Firm Classification	N	Q1	Median	Q3	Mean	Median	Distribution	Mean
Domestic Single Activity Firms	13,611	-0.343	0.000	0.303	0.003	Z = 5.713	Z = 6.195	t = 5.73
Internationally Diversified Single Activity Firms	9,760	-0.359	0.035	0.444	0.044			
Domestic Multi-Activity Firms	1,557	-0.329	-0.029	0.262	-0.037	Z = 4.241	Z = 3.283	t = 4.73
Internationally Diversified Multi-Activity Firms	3,702	-0.273	0.017	0.314	0.027			

Table 4: Multivariate Test of Value Impact of International Corporate Diversification

OLS estimates of the regression of adjusted-value measure on an international operations indicator and relative corporate control variables. This value measure is adjusted *only* for industry effects and measured as the natural logarithm of the ratio of a firm's total market capitalization to its imputed capitalization. The firm's imputed capitalization is equal to the firm's sales multiplied by the median ratio of capitalization to sales among *all single-activity firms* in that industry with sales greater than \$40m. For the regression extreme values of this measure (above 1.386 or below -1.386 implying actual market values either more than four times or less than one-fourth of the imputed value) are deleted. Indicator variables for international operations take a value of 1 if the firm reports information for international operations and zero otherwise. The other control variables are all measured relative to the industry median measures. Extreme values above 99th, or below 1st, percentiles are also excluded from regression. Coefficients on year dummies are omitted from the table. Observations with a R&D or advertising to sales ratio greater than 50% are deleted from the sample.

Panel A: Full Pooled Sample (1984-1998)

OBS	Adjusted R ²	INTDIV	ACTDIV	Relative Firm Size	Relative EBIT/Sales	Relative Leverage	Relative Capital Ex/Sales	Relative R&D/Sales	Relative Advertising /Sales
18,553	0.325	0.0140 (0.007) ^b	-0.0343 (0.010) ^a	0.0020 (0.003)	3.5085 (0.045) ^a	0.0164 (0.018)	1.6063 (0.051) ^a	2.6954 (0.108) ^a	0.7873 (0.146) ^a

Table 4: Multivariate Test of Value Impact of International Corporate Diversification (con't)

Panel B: By-Year Regression								
Year	INTDIV	ACTDIV	Relative Firm Size	Relative EBIT/Sales	Relative Leverage	Relative CapEx/Sales	Relative R&D/Sales	Relative Advert/Sales
1984	-0.109	-0.052	-0.017	3.783	0.005	1.603	2.620	0.730
1985	-0.057	-0.101	-0.008	3.062	-0.138	1.739	4.460	1.510
1986	-0.060	-0.138	0.025	3.848	0.124	1.119	3.557	1.009
1987	0.000	-0.045	0.009	3.392	0.094	1.477	4.022	1.271
1988	0.048	-0.060	-0.010	3.378	0.254	1.774	2.614	2.542
1989	0.038	-0.036	0.014	3.046	0.060	1.915	0.877	0.507
1990	0.021	-0.020	0.015	3.610	0.098	1.950	0.831	0.722
1991	-0.033	-0.007	0.004	3.440	-0.155	1.457	1.805	0.289
1992	0.004	-0.041	-0.009	3.910	-0.104	1.389	1.103	-0.135
1993	0.024	-0.047	0.003	4.042	-0.054	1.820	1.423	-1.106
1994	0.012	0.012	0.006	3.685	0.121	1.586	2.724	0.375
1995	0.033	-0.063	-0.002	3.800	-0.005	1.234	3.053	0.672
1996	0.072	-0.035	-0.007	3.383	-0.082	1.909	3.528	1.031
1997	0.047	-0.023	-0.012	3.541	0.044	1.439	3.267	1.754
1998	0.016	-0.024	0.043	3.099	0.048	1.683	3.273	1.826
Mean	0.004	-0.045 ^a	0.003	3.535 ^a	0.021	1.606 ^a	2.610 ^a	0.867 ^a
Std Dev of Mean	0.013	0.009	0.004	0.081	0.029	0.065	0.299	0.227

Table Notes: The top numbers in Panel A are the OLS estimate of the parameter estimate and the numbers below in parentheses is the White (1980) heteroskedasticity corrected standard error. Panel B displays the coefficient estimates of year-by-year regressions, with the time series mean and standard deviation of the mean for each coefficient at the bottom of the column. Superscript a, b, and c indicate statistical significant at the 1, 5 and 10 percent levels for two tailed tests.

Table 5: Investigation into Sources of Value of International Diversification Value Effect

Reported OLS estimates are from the regression of adjusted-value measures on relative control variables, geographic and industrial diversification indicators, and interaction terms of the diversification indicator variables and various firm characteristics. The value measure is adjusted for industry and multinationality effects and measured as the natural logarithm of the ratio of a firm's total market value to its imputed value. A firm's imputed value is the sum of the imputed market values of its segments, with each segment's imputed value equal to the segment's sales multiplied by the median ratio of capital to sales among the domestic single-activity firms in that industry with sales greater than \$40m. The extreme values of the natural logarithm of actual to imputed value above 1.386 or below -1.386 (i.e., actual values either more than four times imputed, or less than one-fourth imputed value) are deleted. Coefficients on year dummies are omitted from the table. Indicator variables for international operations and industrial diversification take a value of 1 if the firm reports any segment information in that dimension and zero otherwise. The degree of geographic (industrial) diversification is the number of segments reported in COMPUSTAT. The other control variables are all measured relative to the industry (or sales-weighted composite industry) median measures. Observations with an R&D or advertising to sales ratio greater than 50% are deleted from the sample. The control variables are calculated in a straightforward fashion given their definition using standard COMPUSTAT data. The interacted terms pick up the differential relation between the control variables and value for firms diversified in each dimension relative to the single-activity domestic firms. Dependent variable: adjusted-value measure.

	Full Sample	
	Estimate	Std. Error
Intercept	-0.0307	0.0048
Relative Size	0.0016	0.0042
Relative EBIT/Sales	3.4473	0.0678
Relative Leverage	0.0469	0.0246
Relative CapEx/Sales	1.5310	0.0641
Relative R&D/Sales	3.7334	0.2245
Relative Advert/Sales	0.3548	0.2426
International operations Indicator (INTDIV)	0.0100	0.0100
INTDIV * Degree of Diversification	0.0032 ^c	0.0017
INTDIV * Relative Size	-0.0111 ^c	0.0058
INTDIV * Relative EBIT/Sales	0.0593	0.0906
INTDIV * Relative Leverage	-0.1086 ^a	0.0377
INTDIV * Relative CapEx/Sales	0.3033 ^a	0.1100
INTDIV * Relative R&D/Sales	-1.5244 ^a	0.2557
INTDIV * Relative Advert/Sales	0.7266 ^a	0.3086
INTDIV * Change in FX Rate	-0.1884 ^a	0.0471
Industrial Diversification Indicator (ACTDIV)	-0.0898 ^a	0.0297
ACTDIV * Degree of Diversification	-0.0009	0.0111
ACTDIV * Relative Size	0.0305 ^a	0.0086
ACTDIV * Relative EBIT/Sales	0.1820	0.1801
ACTDIV * Relative Leverage	0.1312 ^a	0.0570
ACTDIV * Relative CapEx/Sales	-0.1100	0.1852
ACTDIV * Relative R&D/Sales	0.8334 ^c	0.4667
ACTDIV * Relative Adv/Sales	-0.4432	0.4141
OBS	18,553	
R-Squared	0.328	

Table notes: : The numbers in each row is the OLS estimate of the parameter and the White (1980) heteroskedasticity corrected standard error. Superscript a, b, and c indicate statistical significant at the 1, 5 and 10 percent levels for two tailed tests.

Table 6: Robustness of Multivariate Tests – Effect of Different Assumptions on Size

OLS estimates of the regression of adjusted-value measure on an international operations indicator and relative corporate control variables. This value measure is adjusted *only* for industry effects and is measured as the natural logarithm of the ratio of a firm's total market capitalization to its imputed capitalization. The firm's imputed capitalization is equal to the firm's sales multiplied by the median ratio of capitalization to sales among *all single-activity firms* in that industry with sales greater than \$20m. For the regression extreme values of this measure (above 1.386 or below -1.386 implying actual market values either more than four times or less than one-fourth of the imputed value) are deleted. Indicator variables for international operations take a value of 1 if the firm reports information for international operations and zero otherwise. The other control variables are all measured relative to the industry median measures. Coefficients on year dummies are omitted from the table. Extreme values above 99th, or below 1st, percentiles are also excluded from regression. Observations with a R&D or advertising to sales ratio greater than 50% are deleted from the sample.

OBS	Adjusted R ²	ACTDIV	INTDIV	Relative Firm Size	Relative EBIT/Sales	Relative Leverage	Relative Capital Ex/Sales	Relative R&D/Sales	Relative Advertising /Sales
Panel A: Minimum Sales Size \$20M									
23,660	0.249	-0.0555 (0.010) ^a	-0.0195 (0.007) ^b	-0.0032 (0.003)	2.5791 (0.037) ^a	-0.0085 (0.017)	1.586 (0.044) ^a	2.9560 (0.091) ^a	1.1129 (0.143) ^a
Panel B: Adjusted Market Capitalization as Control Variable for Relative Firm Size									
23,660	0.369	-0.2039 (0.009) ^a	-0.1572 (0.006) ^a	0.1385 (0.002) ^a	1.6455 (0.036) ^a	0.1498 (0.017) ^a	1.2622 (0.041) ^a	2.5079 (0.084) ^a	0.5064 (0.131) ^a

Table Notes: The top number is the OLS estimate of the parameter estimate and the number below in parentheses is the White (1980) heteroskedasticity corrected standard error. Superscript a, b, and c indicate statistical significant at the 1, 5 and 10 percent levels for two tailed tests.