

1-1-1999

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David J. Denis
Purdue University

Diane K. Denis
Purdue University

Keven Yost
Purdue University

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David J. Denis
Purdue University

Diane K. Denis
Purdue University

Keven Yost
Purdue University

99-005

Krannert Graduate School of Management
Purdue University
1310 Krannert Building
West Lafayette, IN 47907-1310
(765) 494-4463
Fax (765) 494-9658

Global Diversification, Industrial Diversification, and Firm Value*

David J. Denis, Diane K. Denis, and Keven Yost

*Krannert Graduate School of Management
Purdue University*

West Lafayette, IN 47907-1310

January, 2000

Preliminary and incomplete
Comments welcome

Abstract

Using a sample of 27,287 firm-years over the period 1984-1993 we document an increasing trend in both the incidence and level of global diversification over time. This trend does not, however, reflect a substitution of global for industrial diversification. Global diversification results in average valuation discounts of the same magnitude as those for industrial diversification. Analysis of the changes in excess value associated with changes in diversification status reveals that increases in global diversification reduce excess value, while reductions in global diversification increase excess value.

* This project has been funded in part by a summer research grant from Purdue University's Center for International Business and Education Research (CIBER).

Global Diversification, Industrial Diversification and Firm Value

1. Introduction

A considerable fraction of U.S. corporations diversify their operations, either across multiple lines of business (industrial diversification), across different national markets (global diversification), or both. Over the past decade, an extensive academic literature has developed documenting the causes and consequences of industrial diversification. Studies in this literature report that, on average, diversified firms are valued at a discount relative to a portfolio of comparable single-segment firms. This value discount appears to stem, in part, from inefficient investment policies in diversified firms. In addition, the evidence indicates a trend towards less industrial diversification since the mid-1980s, and a gain in shareholder value associated with refocusing strategies.¹ Collectively, these findings suggest that, on average, the costs of industrial diversification outweigh the benefits. Because industrial diversification potentially benefits corporate managers through increased power and prestige, through compensation arrangements, or through personal risk reduction, a plausible interpretation of this evidence is that industrial diversification represents a cost of the agency relationship that exists between managers and shareholders.²

Considerably less attention has been focused on the causes and consequences of global diversification, and virtually none on the relation between the two forms of corporate

¹ For evidence on the valuation effects of industrial diversification, see Berger and Ofek (1995), Lang and Stulz (1994), and Servaes (1996). Evidence on the investment policies of diversified firms can be found in Denis and Thotheadri (1999), Rajan, Servaes and Zingales (1999), Scharfstein (1997) and Shin and Stulz (1998). For evidence on the trend towards increased corporate focus and the valuation consequences of this increased focus, see Comment and Jarrell (1995).

² Further support for this interpretation comes from the findings in Denis, Denis, and Sarin (1997) that (i) diversified firms are characterized by lower managerial equity ownership and lower equity ownership by outside blockholders, and (ii) decreases in industrial diversification are often precipitated by market disciplinary forces such as corporate control threats.

diversification. These issues are interesting for at least three reasons. First, global diversification is quite pervasive. In the broad cross-section of U.S. firms that we study, 30% of the firm-year observations exhibit some degree of global diversification. This compares with 20% of the firm-year observations that exhibit some degree of industrial diversification over the same period. Second, as is the case with industrial diversification, theoretical arguments suggest that global diversification can have both value-enhancing and value-reducing effects. Yet, the empirical evidence on the valuation effects of global diversification is somewhat limited, and its implications mixed. Finally, it is plausible that the increased integration of global economies has changed the relative costs and benefits of industrial and global diversification. While the opening of new markets has increased the feasibility of global diversification, heightened global competition has arguably forced more firms to focus on their core lines of business. This line of argument suggests that global diversification has increased over time, and is correlated with the decline in industrial diversification over the same time period. To our knowledge, however, there is little evidence on either time-series trends in global diversification or on correlations between industrial and global diversification.

We provide evidence on trends in global diversification over time, the correlation between industrial and global diversification, and the valuation consequences of both forms of diversification. Our sample comprises 27,287 firm-year observations for U.S. corporations between 1984 and 1993. We document a substantial increase in the extent of global diversification over the sample time period. Among firms that remain in the sample throughout the 1984-1993 period, the fraction of firms that are globally diversified increases from 0.32 to 0.40. This change is statistically significant at the 0.01 level. In addition, among firms that are globally diversified, the fraction of total sales that come from foreign operations increases from

0.22 to 0.29 between 1984 and 1993. Again, the difference is significant at the 0.01 level. Thus, the observed increase in the prevalence of global diversification over time stems from both an increase in the fraction of firms operating in multiple national markets and, conditional on the existence of global diversification, the fraction of total firm sales that are attributable to foreign operations.

Contrary to the hypothesis that increased global diversification substitutes for industrial diversification, we find no evidence of a negative correlation between the two forms of diversification at the individual firm level. In fact, global diversification is positively correlated with industrial diversification at the firm level. Moreover, firm-year changes in global diversification are positively correlated with changes in industrial diversification. Thus, if anything, the sample firms appear to treat the two forms of diversification as if they are complements rather than substitutes.

Finally, we explore the valuation consequences of global diversification using a variation of the measure of excess value first proposed in Berger and Ofek (1995), and later modified in Bodnar, Tang, and Weintrop (1998). We find that globally diversified firms trade at a discount relative to a portfolio of single-segment, domestic firms operating in the same industries. This finding closely resembles the diversification discount associated with industrial diversification, and suggests that, on average, the costs of global diversification outweigh the benefits. Further support for this interpretation comes from our time-series findings that increases in global diversification are associated with significant reductions in excess value, while reductions in global diversification are associated with increases in excess value.

We further stratify the subsample of globally diversified firms to examine whether there are significant interactions between global and industrial diversification and whether there are

variations in the valuation consequences of this interaction over time. We find that firms that are both globally and industrially diversified do not suffer a diversification discount on average. However, this result is driven by the latter half of the sample period, in which firms that are both globally and industrially diversified are valued at a premium relative to single segment, domestic firms. Moreover, multivariate analysis reveals that, after controlling for other factors that potentially affect excess value, being globally diversified is associated with a diversification discount that is similar in magnitude to that associated with being industrially diversified. This discount holds across time periods and whether or not the firm is also industrially diversified. Thus, we conclude that global diversification, like industrial diversification, has a negative valuation effect on the average firm.

The remainder of the paper is organized as follows. Section 2 outlines the theoretical costs and benefits of global diversification and reviews the existing empirical evidence. We also develop hypotheses for the relation between industrial and global diversification. Section 3 describes our sample selection process and measures of diversification, and reports some descriptive statistics. Section 4 presents our primary empirical results. Section 5 concludes.

2. Theory and prior evidence on global diversification

Theoretical arguments suggest that global diversification can have both positive and negative effects on firm value. In addition, the relative costs and benefits of global diversification have, in theory, changed over time. In this section, we review the theoretical arguments on these issues and discuss the related empirical evidence.

2.1. Potential costs and benefits

Previous authors hypothesize that global diversification enhances shareholder value by exploiting firm-specific assets, by increasing operating flexibility, and by satisfying investor preferences for holding globally diversified portfolios.

Morck and Yeung (1998) propose that the value of diversification has its roots in the internalization theory of synergy, proposed initially in Caves (1971). According to this theory, synergistic benefits stem from the existence of valuable information-based assets within the firm. Because these assets have increasing returns to scale, and are difficult to sell, it is optimal for firms possessing information-based assets to internalize the markets for these assets. Global diversification can be viewed as one mechanism for bringing buyers and sellers of information-based assets together within the same firm. According to this view, therefore, global diversification increases value in the presence of substantial intangible assets, such as superior production skills, marketing skills, and management quality.

Global diversification might also increase value by creating the flexibility within the firm to respond to changes in relative prices, differences in tax codes, and other institutional differences. For example, the multinational firm has the flexibility to shift production to that country in which production costs are lowest, or shift distribution to that country in which market demand is highest. This argument is similar to Stein's (1997) 'winner-picking' model of investment decisions in industrially diversified firms. Similarly, the multinational firm has the ability to lower the firm's overall tax liability by exploiting differences in tax systems across countries, and, assuming some degree of market segmentation, can choose to raise capital in the country in which the costs of doing so are lowest.

Finally, the benefits of global diversification can arise from investors' diversification preferences. To the extent that corporations can diversify internationally at lower cost than can individuals, investors will be willing to pay a premium for globally diversified firms, *ceteris paribus*.

Although there are several possible ways in which global diversification can enhance shareholder wealth, there are equally plausible reasons to believe that global diversification will reduce shareholder wealth. A globally diversified organization is more complex than a purely domestic firm. This complexity can lead to high costs of coordinating corporate policies. Myerson (1982) and Harris, Kreibel, and Raviv (1982) discuss costs of information asymmetry between corporate headquarters and divisional managers in multi-segment organizations. In addition, Bodnar, Tang, Weintrop (1998) hypothesize that the monitoring of managerial decision-making can be more difficult in a complex, globally diversified firm.

As is the case with industrial diversification, global diversification can also lead to the inefficient cross-subsidization of less profitable business units. Meyer, Milgrom, and Roberts (1992), Rajan and Zingales (1995), Rajan, Servaes, and Zingales (1999), and Scharfstein and Stein (1997) present models in which divisional managers exert influence to increase the assets under their control. This leads in some cases to less profitable divisions being subsidized by (and at the expense of) more profitable divisions.

It is worth noting again that managers may have the incentive to adopt and maintain value-reducing diversification strategies even if doing so reduces shareholder wealth. Managers can benefit from global diversification in at least three ways. First, managing a large, multinational corporation confers much greater power and prestige on the manager [see, e.g. Jensen (1986) and Stulz (1990)]. Second, levels of managerial compensation tend, on average, to be positively

correlated with firm size [see, e.g. Jensen and Murphy (1990)]. Third, to the extent that the cash flows of global segments are imperfectly correlated, global diversification reduces the risk of the manager's relatively undiversified personal portfolio [see, e.g. Amihud and Lev (1981)]. If these private benefits exceed the managers' private costs, the firm may pursue value-reducing global diversification.

2.2. Trends in diversification over time

It is possible that the relative costs and benefits of industrial and global diversification have changed over time. Shleifer and Vishny (1991) argue that the relaxation of antitrust enforcement in the early 1980s allowed firms to focus more on their core line of business, thereby diminishing the value of industrial diversification. In addition, Liebeskind and Opler (1994) suggest that an increased focus on core lines of business may have been necessitated by increases in global competition. At the same time, the increased integration of world markets has made global diversification more feasible. On net, therefore, these factors predict that changes in the global competitive environment have led to an increase in global diversification and a decrease in industrial diversification over time.

An alternative view, however, is that decreases in industrial diversification represent forced reversals of prior diversification mistakes [see, e.g. Jensen (1993)]. Under this view, the active market for corporate control in the 1980s and enhanced corporate governance practices have limited the ability of managers to pursue value-reducing industrial diversification strategies. If diversification decisions are driven by agency cost considerations, the implications of this for the trend in global diversification over time are unclear. If global diversification, like industrial diversification, reduces value, we expect a decrease in global diversification over time. On the

other hand, if global diversification is either value-increasing or at least less value-reducing than industrial diversification, we expect an increase in global diversification over time.

Managers can achieve many of the same private benefits with global diversification as they can with industrial diversification. To the extent that global diversification has become more feasible over time due to the opening of new international markets, and the private costs of global diversification are lower than for industrial diversification, managers may substitute global diversification for industrial diversification. This argument suggests a trend towards increased global diversification over time and a negative correlation between changes in industrial and global diversification.

2.3. Prior empirical evidence

Several prior studies have examined the valuation effects of global diversification and have produced mixed results. Using samples of multinational firms only, Errunza and Senbet (1981, 1984) document a positive relation between their measure of excess firm value and the firm's degree of internationalization. They interpret their findings as evidence that global diversification completes the market for investors who otherwise face barriers to international capital flows. Like Errunza and Senbet (1981, 1984), Morck and Yeung (1991) document a positive relation between firm value and internationalization. However, Morck and Yeung (1991) find that this positive association is present only for those firms with firm-specific intangible assets. Thus, they interpret their findings as support for the view that global diversification enhances firm value because it allows firms to exploit their firm-specific skills on a global level.

A drawback to the above studies is that they employ relatively small samples of firms from the 1970s. Using larger samples from the 1980s and 1990s, Bodnar, Tang, and Weintrop (1998) find that global diversification is associated with higher firm value, while Christophe (1997), and Christophe and Pfeiffer (1998) find that global diversification reduces firm value.

Thus, the evidence on the valuation effects of global diversification is largely inconclusive. In addition, although there is substantial evidence on trends in industrial diversification over time [see, for example, Comment and Jarrell (1995)], there is, to our knowledge, no comparable evidence on trends in global diversification over time. Finally, the relation between changes in industrial diversification and changes in global diversification is unexplored. In addition to providing further evidence on the valuation effects of global diversification, our study addresses these issues.

3. Sample selection and diversification measures

3.1. Sample selection

Beginning in 1977, U.S. firms are required to report audited financial information for individual industrial and foreign segments that account for greater than 10% of consolidated sales, profits, or assets. *Compustat* reports this information on its Industry Segment and Geographic Segment tapes.³ The accounting data available by segment is limited to sales; operating profit; depreciation, depletion, and amortization; capital expenditures; and identifiable assets.

³ *Compustat* defines geographic segments based upon operations at the country level. Authors of prior research on diversification across countries also frequently term such diversification to be 'geographic.' However, because 'geographic' diversification could also suggest diversification across regions of a country, we prefer to use the term 'global' diversification.

In each year from 1984 through 1993, we identify all firms for which there is data on both the Industry Segment and the Geographic Segment tapes. We eliminate utility and financial firms (SIC codes 4900-4999 and 6000-6999, respectively), and firms incorporated outside of the U.S. We eliminate firm-years in which any industrial segment has sales of less than \$20 million and firm-years in which the total of either industrial or global segment sales is not within 1% of total reported firm sales for that year.⁴ This results in a sample of 27,287 firm years, associated with 5,332 firms.

Table 1 presents descriptive statistics on size and diversification measures for the overall sample and for the subsamples that are industrially and globally diversified. The mean (median) firm has assets of \$974 million (\$127 million) and sales of \$985 million (\$159 million). Globally diversified firms are larger than the sample as a whole and industrially diversified firms are larger than globally diversified firms, on average.

We report three measures of industrial diversification in table 1: the reporting of more than one business segment, the average number of business segments, and a sales-based Herfindahl index. In 20% of the sample firm-years, more than one industrial segment is reported; i.e. the firm is industrially diversified in that year. Of the firm-years that are globally diversified, 33% are also industrially diversified. The average number of industrial segments is 1.39 overall, 2.91 among industrially diversified firm-years, and 1.68 among globally diversified firm-years. It should be noted that *Compustat* limits the number of industrial segments to ten; however, there are only ten firm-years in which ten industrial segments are reported. Finally, the average sales-

⁴ These sales-related requirements are associated with the calculation of the excess value measures that will be utilized in the paper. The requirement that all industrial segments have sales of at least \$20 million avoids the problem of comparing very small segments to much larger single-segment firms. The requirement that segment sales total within 1% of total firm sales ensures that all firm sales have been allocated to individual business and global segments. This requirement is common to other diversification studies.

based Herfindahl index is 0.90 overall, 0.52 among industrially diversified firms, and 0.84 among globally diversified firms.

Global segment data provided by *Compustat* are much less detailed than industrial segment data. The number of global segments is limited to four, including the domestic segment; i.e. no more than three foreign segments are reported for any firm, regardless of the number of countries in which it operates. Given this limitation, the number of global segments in which a firm operates has limited meaning and we do not report it as a measure of global diversification. In addition, because the database does not specify the individual countries that are included in each segment, we are unable to use number of countries as a measure of global diversification.

Table 1 presents summary statistics for two measures of global diversification: the fraction of firms that are globally diversified and the fraction of total sales that comes from foreign operations.⁵ We classify a firm as globally diversified if it reports any sales by foreign subsidiaries. Thirty percent of the sample firm-years are globally diversified; among the subsample of firm-years that are industrially diversified, this rises to 48%. The average firm in the average year derives 8% of its sales from foreign operations; for industrially diversified firms the corresponding figure is 11%. Among firms that are globally diversified, foreign sales average 26% of total annual sales.⁶

⁵ Export sales by the domestic subsidiary are not treated as foreign sales.

⁶ Compustat reports sales for each of the four global segments, as well as total foreign sales. However, there are 743 firm-years for which the global segment that includes the domestic operations also includes some foreign operations. Compustat reports total foreign sales for these firms as missing because it cannot isolate the foreign from the domestic sales in that one segment. We adjust total foreign sales for these firms to equal the sum of sales in the three segments that do not include any domestic operations. By doing so, we appropriately label these 743 firms as globally diversified. Their foreign sales, however, will be understated by the amount of foreign sales that is included with the domestic segment.

3.2 Diversification trends

One purpose of this study is to document trends in diversification among U.S. corporations. In table 2, we document industrial and global diversification measures by year. Panel A presents results for the sample as a whole. The fraction of the sample firms that are industrially diversified declines steadily over the period, from 0.262 in 1984 to 0.161% in 1993. Furthermore, the degree of diversification observed among those firms that are industrially diversified also declines over the period. The average industrially diversified firm in 1984 has 3.15 segments, while the average industrially diversified firm in 1993 has only 2.74 segments. The decline is steady and monotonic, with the exception of a small increase in the average number of segments in 1992. The sales-based Herfindahl index increases from 0.49 to 0.54 over the period, again consistent with a decrease in the degree of industrial diversification. For all three industrial diversification measures, the change from 1984 to 1993 is significant at the 0.01 level. These results are consistent with those of Comment and Jarrell (1995), who document increases in industrial focus over the 1978-1989 time period.

The panel A results for the global diversification measures suggest a trend towards increased global diversification, though not a particularly strong one. The fraction of the sample firms that are globally diversified is essentially constant over the period, varying only slightly on either side of 30%, and the change in this fraction from 1984 to 1993 does not differ significantly from zero. Among those firms that are globally diversified, however, the fraction of sales that comes from their foreign operations increases over time, on average, from 0.212 in 1984 to 0.278 in 1993. The change over the whole period is significant at the 0.01 level.

The panel A results could be somewhat misleading. The increasing number of firms indicates a net addition of firms over time. If new firms are less likely to be either industrially or

globally diversified than those firms already in the sample, there will be a bias towards reductions in average diversification over time even if individual firms are not altering their diversification status. To examine this issue, we reproduce the panel A results for the subsample of firms that are in the sample both in 1984 and in 1993. We label this the constant composition sample.

The results for this subsample, reported in panel B, indicate that, among firms that are on Compustat in both 1984 and 1993, the fraction of firms that are industrially diversified declines only from 0.291 in 1984 to 0.267 in 1993; this decline does not differ significantly from zero. On the other hand, there is a pronounced and statistically significant (at the 0.01 level) increase in the fraction of firms that are globally diversified in this subsample: from 0.323 to 0.403. The panel B results with respect to degree of diversification are essentially the same as those in panel A. The degree of industrial diversification declines significantly over the sample period, while the degree of global diversification increases significantly.

3.3 The relation between global and industrial diversification

The results of the previous subsection establish that there is a decline in the degree of industrial diversification and an increase in the degree of global diversification over the sample period. As discussed earlier, there are at least two reasons to think that these trends may be related at the firm level. First, the increased feasibility of global diversification may lead firms to substitute global for industrial diversification, perhaps because resources limit the ability to pursue both, and/or because global competitiveness is enhanced by greater focus on an industrial core. Second, if industrial and global diversification provide similar private benefits to

managers, and if global diversification is more valuable, on average, then managers may substitute global for industrial diversification over time.

Table 3 presents a variety of correlations between global and industrial diversification for the full sample and for the constant composition subsample. The base variables correlated are *Indum* and *Gdum*, each a dummy variable that takes the value 1 if the firm is industrially/globally diversified in the given firm-year. *Segn*, which equals the number of industrial segments; and *%For*, which is the fraction of the firm's sales that are made by foreign operations in the given firm-year.

Panel A presents correlations for levels of the base variables for the full sample and for the subsamples that are industrially diversified and globally diversified. Overall, the results suggest that industrial and global diversification are, in fact, significantly positively correlated; i.e. those firms that are globally diversified are more likely to be industrially diversified as well. However, the results for the subsample of firm-years in which *Gdum*=1 do indicate a significant negative relation between *%For* and both *Indum* and *Segn*. Thus, among those firms that are globally diversified, the degree of global diversification is higher in firms that are less industrially diversified.

The positive correlations documented in panel A could reflect the fact that larger firms are more likely to be industrially diversified and more likely to be globally diversified. Panel B presents correlations among changes in the base variables from year to year, which should be less correlated with firm size. Once again, the overall results do not suggest that the opposing trends in industrial and global diversification are related at the firm level. All correlations are positive, though many do not differ significantly from zero.

Finally, panel C of table 3 presents correlations among changes in the base variables between 1984 and 1993 for the subsample of firms that are in the sample in both 1984 and 1993. For the full subsample, the correlations do not differ significantly from 0, suggesting no relation at all among changes in industrial and global diversification.

Overall, the table 3 results provide no evidence that increases in global diversification over time are due to a substitution of global for industrial diversification by individual firms. In the following section, we examine the valuation effects of global and industrial diversification.

4. The valuation effects of diversification

4.1 Excess value

We measure the valuation effects of diversification using a variation of the excess value measure originally developed by Berger and Ofek (1995) and modified by Bodnar, Tang, and Weintrop (1998). We compute the percentage difference between a firm's value of total capital (market value of equity plus book value of debt) and the sum of the imputed values of its industrial segments as stand-alone domestic firms. Imputed segment values are calculated by multiplying the median ratio, for single-segment, purely domestic firms in the same industry, of total capital to sales for the segment. The industry median ratios are based on the narrowest SIC grouping that yields five single-segment domestic firms that have at least \$20 million in revenue in each segment and for which we have the data necessary to compute ratios.⁷ We sum these imputed values across the segments within the firm to obtain an estimated imputed value for the entire firm. Excess value is measured as the log of the ratio of the firm's actual value to its

⁷ Imputed values are calculated using four-digit SIC codes for 43.2% of the sample segment-years, three-digit codes for 24.0% of the sample segment-years, and two-digit codes for 29.1% of the sample segment-years. For 3.7% of the sample segment-years we are unable to calculate an excess value. The end-result of these segments for which we are unable to obtain a five-firm comparison sample, along with missing data and extreme outliers, is that we are able to calculate excess values for only 21,142 of the original 27,287 firm-years.

imputed value. Like Berger and Ofek (1995), we exclude 'extreme' excess values, defined as those observations for which actual value is either more than four times imputed value or less than one-fourth imputed value.

Table 4 presents excess value measures for a variety of subsamples defined by diversification status. In addition, we explore the possibility that the valuation effects of diversification have changed over time by presenting separate measures for the 1984-1988 and 1989-1993 subperiods. From the large amount of data presented in table 4, several interesting observations can be made. First, overall, global diversification is associated with reduced value. The average (median) excess value for globally diversified firms is -0.0153 (-0.0394). However, the mean excess value of globally diversified firms does not differ significantly from that of firms that are not globally diversified, though the medians of the two subsamples do differ at the 0.10 level. In addition, subperiod results suggest that the negative excess values associated with global diversification are confined to the earlier 1984-1988 subperiod. The difference in excess values between firms that are and are not globally diversified is significant at the 0.01 level during this subperiod.

Table 4 also documents excess values for firms that are and are not industrially diversified. Overall, industrial diversification is associated with an average (median) excess value of -0.0204 (-0.0330). These values differ significantly from zero at the 0.01 level; however, neither mean nor median excess value differs significantly between the subsamples of firms that are and are not industrially diversified. As with global diversification, subperiod analysis reveals that the negative excess value associated with industrial diversification is driven by the earlier 1984-1988 subperiod. The excess value associated with industrial diversification is significantly negative in this subperiod and the difference in excess values between firms that are and are not industrially

diversified is significant at the 0.01 level. Thus, it appears that global and industrial diversification are associated with reductions in value in the 1984-1988 period but are value-neutral in the 1989-1993 period. This may suggest that increased monitoring from the corporate control market and/or improved corporate governance systems led those firms for which diversification reduces value to focus their operations.

Because we are interested in the relation between global and industrial diversification, we break the full sample into four subsamples: firm-years that are neither globally nor industrially diversified, firm-years that are both globally and industrially diversified, firm-years that are only globally diversified, and firm-years that are only industrially diversified. This further refinement yields surprising results. Being either globally or industrially diversified is associated with significant negative excess value, on average, in both subperiods and being both industrially and globally diversified is associated with negative excess value in the 1984-1988 subperiod. However, being both globally and industrially diversified in the 1989-1993 subperiod is associated with strong and significant positive excess values, on average.

The results thus far suggest that, despite the fact that industrial diversification has decreased and global diversification has increased over time, they are actually complementary forms of diversification. Firms that are industrially diversified are more likely to be globally diversified (and vice versa) and, more importantly, the two forms of diversification together are value-increasing, while either type of diversification on its own destroys value. However, the analysis to this point has been univariate in nature. In the following section we examine the effect of diversification on value in a multivariate setting.

4.2 Multivariate results

To provide multivariate evidence on the valuation effects of the different types of diversification, we estimate ordinary least squares regressions of excess value on three dummy variables denoting: (i) firms that are industrially but not globally diversified; (ii) firms that are globally but not industrially diversified; and (iii) firms that are both industrially and globally diversified. Thus the regression coefficients on the dummy variables represent the difference in excess value between the firms in each diversification category and the excess values of single-segment domestic firms.

In addition, we control for other possible determinants of excess value, including firm size, measured as the market value of total capital, the ratio of long-term debt to total assets, the ratio of capital expenditures to sales, the ratio of earnings before interest and taxes (EBIT) to sales, the ratio of research and development expenditures to sales, and the ratio of advertising expenditures to sales. Because excess values are measured relative to single-segment domestic firms, we compute relative measures of all independent variables in a similar manner.⁶ Where there are missing observations for research and development expenditures or advertising expenditures, we set the missing values to zero. Our results are not sensitive to this choice, however. We obtain similar results if we exclude all observations with missing data.

In the first column of table 5, we report the results for the full sample of 21,142 firm-year observations. Consistent with the univariate results presented in table 4, the multivariate results presented in table 5 indicate that excess values are significantly lower for firms that are industrially or globally diversified than they are for single-segment, domestic firms. The multivariate results suggest, however, that these discounts are of larger magnitude than those

⁶ Bodnar Tang, and Weintrop (1998) use a similar approach. Our findings are not sensitive to this choice.

suggested by the univariate results. Table 5 point estimates place the diversification discounts at 0.22 for industrial diversification and 0.17 for global diversification.

The table 5 point estimate of the diversification discount for firms that are both globally and industrially diversified is 0.35. This result stands in stark contrast to the table 4 univariate results, in which these firms do not appear to suffer any diversification discount, on average. The multivariate results suggest that the insignificant average excess values observed for firms that engage in both types of diversification is due to factors other than their being diversified. The marginal valuation effect of being both globally and industrially diversified is strongly negative

The coefficient estimates for the other control variables are similar to those documented in prior studies. Excess values are positively related to relative firm size, capital expenditures, EBIT, R&D, and advertising expenditures, and negatively related to the ratio of long-term debt to total assets.

In columns 2 and 3 of table 5, we examine the robustness of our estimates over time by estimating the cross-sectional regressions for each of the two sub-periods, 1984-1988 and 1989-1993. The results indicate that the point estimates for the value discounts associated with industrial and global diversification and for the combination are fairly stable over time. The discount for industrial diversification is 0.25 in the first sub-period and 0.18 in the second sub-period. Similarly, the discount for global diversification is 0.17 in the first sub-period and 0.16 in the second sub-period. Finally, the discount for being both globally and industrially diversified is 0.40 in the first sub-period and 0.30 in the second sub-period. The sub-period diversification coefficients are all highly significant.

The pooling of cross-sectional and time-series data in our tests raises the possibility of a lack of independence in the regression models. This could result in deflated standard errors and, therefore, biased test statistics. To address this concern, we estimate the regression models for each of the ten calendar years in our sample. We then average the coefficient estimates across the ten years and compute t-statistics of these average coefficients based on the standard deviation of these annual estimates. The results of this test, reported in the fourth column of table 5, are similar to our previous findings. Excess values are negatively related to industrial diversification, to global diversification, and to the combination of the two types of diversification. The coefficients and statistical significance of the other control variables are similar to those in the pooled cross-sectional, time-series data. Thus, on the whole, the pooling of cross-sectional and time-series does not appear to have imparted any meaningful biases on our results.

Another possibility is that there is time-series variation in our value measures. If this time-series variation is correlated with the incidence of global or industrial diversification, our regression estimates could be biased. To address this possibility, we re-estimate our regression models after adding a separate dummy variable denoting each calendar year. The results, not reported in a table, are qualitatively identical to those reported in table 5. Moreover, there is never more than one of the calendar year dummy variables that is significant in any of these augmented regression models. We conclude, therefore, that any time-series variation in our value measures is economically unimportant.

4.3 The valuation effects of changes in diversification

One difficulty in interpreting the valuation results in tables 4 and 5 is that our excess value measure could be endogenously related to the choice of diversification. For example, it is possible that poorly performing firms are more likely to become diversified. If so, diversified firms will exhibit lower values even if diversification per se has no impact on firm value. To address this possibility, we examine whether changes in diversification status are associated with changes in excess value. From the full sample, we identify any year in which a firm either becomes globally diversified or ceases being globally diversified, or becomes industrially diversified or ceases being industrially diversified. We label the year in which the firm's diversification status changes as year 0 and measure the change in excess value from year -1 to year 0.

Table 6 presents year -1 excess values and changes in excess value for these four subsamples for the whole period and for the 1984-1988 and 1989-1993 subperiods. The results as a whole are largely consistent with the overall negative association between excess value and global and industrial diversification. Firms that become either globally or industrially diversified experience statistically significant decreases in excess value and firms that cease being either globally or industrially diversified experience statistically significant increases in excess value, where statistical significance is at at least the 0.10 level. This result holds for the whole sample period and for each of the subperiods, with the following exceptions. The median change in excess value associated with ceasing to be globally diversified in the overall period is positive but not significantly different from zero at the 0.10 level. In addition, becoming globally diversified in the 1984-1988 subperiod is associated with a statistically insignificant change in excess value, as is ceasing to be globally diversified in the 1989-1993 subperiod.

Thus, the table 6 results suggest that firms generally experience significant declines in excess value in a year in which they become diversified. In addition, data on year -1 excess values suggest that firms generally have significantly positive excess value in the year before they diversify globally, and insignificant excess value in the year prior to becoming industrially diversified. Thus, the observed valuation discounts associated with global and industrial diversification are not due simply to poorly-performing firms choosing to diversify.

5. Conclusion

Using a sample of 27,287 firm-years over the period 1984-1993, we document several findings with respect to global diversification, industrial diversification, and the relation between them.

We document an increasing trend in global diversification over time: a greater fraction of U.S. firms have international operations in 1993 than in 1984 and, on average, those firms that are multinational derive a greater fraction of their revenues from their foreign operations in 1993 than in 1984. Industrial diversification declines over the same period, although the decline in number of segments is more pronounced than the decline in the fraction of firms that are industrially diversified. However, we find no evidence that these opposing trends are related at the firm level; i.e. individual firms do not appear to substitute global for industrial diversification.

We find that both global or industrial diversification lead to valuation discounts that are economically and statistically significant relative to single-segment, purely domestic firms. This is true in both the 1984-1988 and the 1989-1993 subperiods. Firms that are either globally or industrially diversified (but not both) have negative excess values, single-segment domestic

firms that become either globally or industrially diversified experience a downward revision in their excess value, and firms that are either globally or industrially diversified experience increases in excess value when they cease being diversified.

Thus, a presumed increase in the feasibility of global diversification over time has, in fact, led to a greater incidence and higher levels of global diversification. Increased feasibility has not, however, translated into value-creation opportunities for the single-segment firms that comprise the majority of U.S. firms.

References

- Amihud, Yakov and Baruch Lev, 1981, Risk reduction as a managerial motive for conglomerate mergers, *Bell Journal of Economics* 12, 605-617.
- Berger, Philip G. and Eli Ofek, 1995, Diversification's effect on firm value, *Journal of Financial Economics* 37, 39-65.
- Bodnar, Gordon M., Charles Tang, and Joseph Weintrop, 1998, Both sides of corporate diversification: The value impacts of global and industrial diversification, Working paper, University of Pennsylvania.
- Caves, Richard, 1971, International corporations: The industrial economics of foreign investment, *Econometrica* 38, 1-27.
- Christophe, Stephen E., 1997, Hysteresis and the value of the U.S. multinational corporation, *Journal of Business* 70, 435-462.
- Christophe, Stephen E. and Ray J. Pfeiffer, Jr., 1998, The valuation of U.S. MNC international operations during the 1990s, Working paper, George Mason University.
- Comment, Robert and Gregg A. Jarrell, 1995, Corporate focus and stock returns, *Journal of Financial Economics* 37, 67-87.
- Denis, David J., Diane K. Denis, and Atulya Sarin, 1997, Agency problems, equity ownership, and corporate diversification, *Journal of Finance* 52, 135-160.
- Denis, David J. and Bharathram Thothadri, 1999, Internal capital markets, growth opportunities and the valuation consequences of diversification, Working paper, Purdue University.
- Errunza, Vihang and Lemma Senbet, 1981, The effects of international operations on market value of the firm: Theory and evidence, *Journal of Finance* 36, 401-417.
- Errunza, Vihang and Lemma Senbet, 1984, International corporate diversification, market valuation, and size-adjusted evidence, *Journal of Finance* 34, 727-745.
- Harris, Milton, Charles D. Kriebel, and Artur Raviv, 1982, Asymmetric information, incentives and intrafirm resource allocation, *Management Science* 28, 604-620.
- Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323-329.
- Jensen, Michael C., 1993, The modern industrial revolution, exit, and the failure of internal control systems, *Journal of Finance* 48, 831-880.

- Jensen, Michael C. and Kevin J. Murphy, 1990, Performance pay and top management incentives, *Journal of Political Economy* 98, 225-264.
- Lang, Larry H. P. and René M. Stulz, 1994, Tobin's q, corporate diversification and firm performance, *Journal of Political Economy* 102, 1248-1280.
- Liebeskind, Julia P. and Tim C. Opler, 1994, Corporate diversification and agency costs: Evidence from privately held firms, Working paper, Ohio State University.
- Myer, Margaret, Paul Milgrom, and John Roberts, 1992, Organizational prospects, influence costs, and ownership changes, *Journal of Economics and Management Strategy* 1, 9-35.
- Myerson, Roger B., 1982, Optimal coordination mechanisms in generalized principal-agent problems, *Journal of Mathematical Economics* 10, 67-81.
- Morck, Randall and Bernard Yeung, 1991, Why investors value multinationality, *Journal of Business* 64, 165-187.
- Morck, Randall and Bernard Yeung, 1998, Why investors sometimes value size and diversification: The internalization theory on synergy, Working paper, Institute for Financial Research, University of Alberta.
- Rajan, Raghuram G., Henri Servaes, and Luigi Zingales, 1999, The cost of diversity: the diversification discount and inefficient investment, *Journal of Finance*, forthcoming.
- Rajan, Raghuram G. and Luigi Zingales, 1995, The tyranny of the inefficient: An inquiry into the adverse consequences of power struggles, Working paper, University of Chicago.
- Scharfstein, David S., 1997, The darker side of internal capital markets II: Evidence from diversified conglomerates, Working paper, Massachusetts Institute of Technology.
- Scharfstein, David S. and Jeremy C. Stein, 1997, The dark side of internal capital markets: Divisional rent-seeking and inefficient investment, Working paper, National Bureau of Economic Research.
- Shin, Hyun-Han and René M. Stulz, 1998, Are internal capital markets efficient?, *Quarterly Journal of Economics* 113, 531-552.
- Shleifer, Andrei and Robert Vishny, 1991, The takeover wave of the 1980s, *Journal of Applied Corporate Finance* 4, 49-56.
- Servaes, Henri, 1996, The value of diversification during the conglomerate merger wave, *Journal of Finance* 51, 1201-1225.
- Stein, Jeremy C., 1997, Internal capital markets and the competition for corporate resources, *Journal of Finance* 52, 111-133.

Stulz, René M., 1990, Managerial discretion and optimal financing policies, *Journal of Financial Economics* 26, 3-27.

Table 1

Descriptive statistics on size and diversification measures for 27,287 firm-years over the period 1984-1993.

	All Firm Years (n=27,287)		Industrially Diversified (n=5,545)		Globally Diversified (n=8,087)	
	Mean	Median	Mean	Median	Mean	Median
Book value of total assets (\$ millions)	\$973.9	\$126.8	\$2,629.1	\$653.6	\$1,750.6	\$250.4
Annual sales (\$ millions)	\$985.2	\$159.3	\$2,540.4	\$770.1	\$1,742.7	\$288.7
Industrial diversification measures:						
Fraction of firm-years industrially diversified	0.20		1.00		0.33	
Number of segments	1.39	1.00	2.91	3.00	1.68	1.00
Sales-based Herfindahl index	0.90	1.00	0.52	0.51	0.84	1.00
Global diversification measures:						
Fraction of firm-years globally diversified	0.30		0.48		1.00	
Fraction foreign sales	0.08	0	0.11	0	0.26	0.22

Table 2

Average annual industrial and global diversification measures for 27,287 firm-years over the period 1984-1993. The number of industrial segments and Herfindahl measures are for the subsample of firms that are industrially diversified. The fraction foreign sales measure is for the subsample of firms that are globally diversified. The constant composition sample includes those firms for which there is Compustat data available throughout the entire 1984-1993 period.

Panel A. Full Sample

Year	N	Fraction Ind'l Diversified	Industrially diversified firm-years only		Fraction Geog. Diversified	Globally diversified firm-years only
			# Ind'l Segments	Sales-based Herfindahl		Fraction Foreign Sales
1984	2,250	0.262	3.15	0.49	0.295	0.212
1985	2,415	0.243	3.09	0.50	0.284	0.219
1986	2,534	0.230	2.98	0.51	0.288	0.243
1987	2,665	0.214	2.93	0.51	0.286	0.254
1988	2,655	0.209	2.91	0.53	0.291	0.269
1989	2,668	0.200	2.87	0.53	0.295	0.275
1990	2,736	0.192	2.85	0.53	0.301	0.290
1991	2,875	0.182	2.76	0.54	0.305	0.280
1992	3,119	0.171	2.78	0.54	0.310	0.283
1993	3,370	0.161	2.74	0.54	0.303	0.278

Panel B. Constant composition sample

1984	1,169	0.291	3.18	0.49	0.323	0.219
1985	1,125	0.279	3.11	0.50	0.326	0.217
1986	1,120	0.282	3.04	0.50	0.345	0.241
1987	1,111	0.267	3.02	0.50	0.355	0.255
1988	1,103	0.270	2.93	0.52	0.365	0.271
1989	1,092	0.270	2.90	0.52	0.368	0.279
1990	1,112	0.270	2.89	0.53	0.375	0.295
1991	1,122	0.269	2.84	0.53	0.390	0.292
1992	1,143	0.265	2.88	0.53	0.403	0.290
1993	1,169	0.267	2.84	0.54	0.403	0.290

Table 3

Correlations among measures of global and industrial diversification for a total sample of 27,287 firm-years and various subsamples. Panel A presents correlations among diversification levels; panel B presents correlations among changes in diversification in individual firm-years; and panel C presents correlations among changes in diversification between 1984 and 1993 for the subsample of firms that are included in the sample in both 1984 and 1993.

Panel A. Correlations between firm-year levels of global and industrial diversification

	<u>Full Sample</u>	<u>Gdum=1</u>	<u>Indum=1</u>
Gdum/Indum	0.1992 ^{***}	NA	NA
Gdum/Segn	0.2063 ^{***}	NA	0.1500 ^{***}
%For/Indum	0.1166 ^{***}	-0.0865 ^{***}	NA
%For/Segn	0.1146 ^{***}	-0.0924 ^{***}	0.0689 ^{***}

Panel B. Correlations between firm-year changes in global and industrial diversification

	<u>Full Sample</u>	<u>L.Gdum=0</u>	<u>L.Gdum=1</u>	<u>L.Indum=0</u>	<u>L.Indum=1</u>
Δ Gdum/ Δ Indum	0.0580	0.0063	0.1677 ^{***}	0.0135 [*]	0.1183 ^{***}
Δ Gdum/ Δ Segn	0.0623 ^{***}	0.0097	0.1407 ^{***}	0.0076	0.1204 ^{***}
Δ %For/ Δ Indum	0.0112	0.0026	0.0226 [*]	0.0069	0.0163
Δ %For/ Δ Segn	0.0135 ^{**}	0.0044	0.0239 [*]	-0.0003	0.0304 [*]
Δ Gdum/L.Indum	-0.0198 ^{***}	0.0287 ^{***}	-0.0341 ^{***}	NA	NA
Δ %For/L.Indum	-0.0104	0.0034	-0.0522 ^{***}	NA	NA
Δ Indum/L.Gdum	-0.0189 ^{***}	NA	NA	0.0143 [*]	0.0272 [*]
Δ Segn/L.Gdum	-0.0363 ^{***}	NA	NA	0.0145 [*]	-0.0201

Panel C. Correlations between changes in global and industrial diversification between 1984 and 1993 for constant composition subsample

	<u>Full Sample</u>	<u>84Gdum=0</u>	<u>84Gdum=1</u>	<u>84Indum=0</u>	<u>84Indum=1</u>
Δ Gdum/ Δ Indum	0.0210	-0.0256	0.0815	0.0272	0.0190
Δ Gdum/ Δ Segn	0.0245	-0.0707 ^{**}	0.1243 ^{**}	0.0067	0.0465
Δ %For/ Δ Indum	-0.0400	-0.0154	-0.0581	-0.0321	-0.0481
Δ %For/ Δ Segn	-0.0077	-0.0201	0.0251	-0.0410	0.0344
Δ Gdum/84Indum	-0.0003	0.1116 ^{***}	0.0034	NA	NA
Δ %For/84Indum	0.0164	0.0079	-0.0389 [*]	NA	NA
Δ Indum/84Gdum	-0.0556 [*]	NA	NA	-0.0210	0.1256 ^{**}
Δ Segn/84Gdum	-0.0816 ^{***}	NA	NA	-0.0015	0.0303

Variable definitions:

- Gdum A dummy variable = to 1 if the firm is globally diversified in the given year and 0 otherwise.
- Indum A dummy variable = 1 if the firm is industrially diversified in the given year and 0 otherwise.
- %For The percentage of the firm's sales derived from foreign operations in the given year.
- Segn The number of industrial segments in the firm in the given year.
- L.Gdum A dummy variable = to 1 if the firm is globally diversified in the year prior to the given year and 0 otherwise.
- L.Indum A dummy variable = to 1 if the firm is industrially diversified in the year prior to the given year and 0 otherwise.
- 84Gdum A dummy variable = to 1 if the firm is globally diversified in 1984 and 0 otherwise.
- 84Indum A dummy variable = to 1 if the firm is industrially diversified in 1984 and 0 otherwise.

***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 4

Mean and median excess value associated with firm-years for which the data required to calculate excess value is available. Excess value is measured as the log of the ratio of the firm's total market value to the sum of the imputed market values of its segments. Imputed segment values are calculated by multiplying the median ratio of total capital to sales for single segment domestic firms in the same industry times the level of sales for the individual segment. Significance of means and medians are measured using a standard two-tailed t-test and a two-tailed Wilcoxon signed rank test, respectively.

<u>Firm-years that are:</u>		<u>1984-1993</u> (N=21,142)	<u>1984-1988</u> (N=9,942)	<u>1989-1993</u> (N=11,200)	p-values for significance of subperiod differences
Globally diversified	Mean	-0.0153**	-0.0327***	-0.0007	0.0145
	Median	-0.0394***	-0.0671***	-0.0162	0.0080
	N	6,618	3,018	3,600	
	%	31.3%	30.4%	32.1%	
Not globally diversified	Mean	-0.0066	-0.0038	-0.0092	0.5136
	Median	0.0000***	0.0000*	0.0000**	0.5655
	N	14,524	6,924	7,600	
	%	68.7%	69.6%	67.9%	
Industrially diversified	Mean	-0.0204***	-0.0520***	0.0157	0.0000
	Median	-0.0330***	-0.0710***	0.0106	0.0001
	N	4,029	2,150	1,879	
	%	19.1%	21.6%	16.8%	
Not industrially diversified	Mean	-0.0067*	-0.0017	-0.0109**	0.2449
	Median	0.0000***	0.0000	0.0000***	0.2279
	N	17,113	7,792	9,321	
	%	80.9%	78.4%	83.2%	
Both globally and industrially diversified	Mean	0.0108	-0.0488***	0.0761***	0.0000
	Median	-0.0092	-0.0690***	0.0498***	0.0001
	N	1,939	1,013	926	
	%	9.2%	10.2%	8.3%	
Neither industrially nor globally diversified	Mean	0.0006	0.0062	-0.0043	0.2405
	Median	0.0000	0.0000	0.0000	0.2043
	N	12,434	5,787	6,647	
	%	58.8%	58.2%	59.3%	
Globally diversified but not industrially diversified	Mean	-0.0261***	-0.0246**	-0.0273**	0.8715
	Median	-0.0546***	-0.0660***	-0.0485***	0.9109
	N	4,679	2,005	2,674	
	%	22.1%	20.2%	23.9%	
Industrially diversified but not globally diversified	Mean	-0.0494***	-0.0548***	-0.0431***	0.5729
	Median	-0.0510***	-0.0744***	-0.0214***	0.3274
	N	2,090	1,137	953	
	%	9.9%	11.4%	8.5%	

***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

Table 5

Ordinary least squares regressions of excess value on dummy variables denoting industrial and global diversification, and a set of control variables. Excess value is measured as the log of the ratio of the firm's total market value to the sum of the imputed market values of its segments. Imputed segment values are calculated by multiplying the median ratio of total capital to sales for single segment domestic firms in the same industry times the level of sales for the individual segment. A firm is industrially diversified if it reports more than one industrial business segment. Likewise, a firm is globally diversified if it reports operations in more than one global business segment. All control variables are measured as deviations from sales-weighted industry median values. The sample includes 21,142 firm-year observations over the period 1984-1993. Coefficient estimates are reported with *t*-statistics in parentheses below. Results are reported for the full sample of firm-years, the sub-periods of 1984-88 and 1989-93, and mean values of annual regressions.

Independent variables	Full sample	1984 to 1988	1989 to 1993	Means of annual estimates
Intercept	0.004 (0.964)	0.006 (1.034)	0.003 (0.460)	0.003 (1.221)
Dummy equal to one if only industrially diversified	-0.218 (-20.167)	-0.245 (-16.538)	-0.184 (-11.692)	-0.210 (-16.735)
Dummy equal to one if only globally diversified	-0.168 (-21.462)	-0.170 (-14.636)	-0.160 (-15.169)	-0.162 (-15.136)
Dummy equal to one if both industrially and globally diversified	-0.350 (-28.387)	-0.397 (-23.328)	-0.295 (-16.708)	-0.340 (-18.329)
Relative market value of total capital	0.132 (56.535)	0.131 (38.473)	0.128 (40.418)	0.128 (67.758)
Relative long-term debt to total assets	-0.350 (-17.398)	-0.182 (-6.079)	-0.475 (-17.601)	-0.344 (-5.291)
Relative capital expenditures to sales	0.397 (18.517)	0.392 (14.077)	0.372 (11.265)	0.446 (7.856)
Relative EBIT to sales	1.109 (38.474)	0.867 (23.512)	1.490 (32.760)	1.210 (11.045)
Relative R&D to sales	1.172 (17.935)	1.506 (13.958)	1.043 (12.745)	1.358 (12.933)
Relative advertising to sales	0.211 (2.116)	0.270 (1.911)	0.154 (1.108)	0.221 (3.238)
Adjusted R ²	0.282	0.262	0.311	0.291

Table 6

Excess values for firms that change their diversification status between 1984 and 1993. Year -1 levels and the change in excess value from year -1 to year 0 are presented. Year 0 is the year in which the firm changes its diversification status. Excess value is measured as the log of the ratio of the firm's total market value to the sum of the imputed market values of its segments. Imputed segment values are calculated by multiplying the median ratio of total capital to sales for single segment domestic firms in the same industry times the level of sales for the individual segment. Panel A presents results for the full sample, while panels B and C present results for the 1984-1988 and 1989-1993 subperiods. Significance of means and medians are measured using a standard two-tailed test and a two-tailed Wilcoxon signed rank test, respectively.

Panel A: Full Sample

	N ^a	Year -1 Excess Value		Δ Excess Value	
		Mean	Median	Mean	Median
Became globally diversified	294	0.112***	0.097***	-0.043*	-0.045*
Ceased global diversification	94	-0.074	-0.006	0.100*	0.093
Became industrially diversified	87	0.013	0.015	-0.197***	-0.183***
Ceased industrial diversification	159	-0.084**	-0.118**	0.178***	0.156***

Panel B: 1984-1988

Became globally diversified	126	0.018	0.000	0.042	0.072
Ceased global diversification	44	-0.117	-0.072	0.194**	0.187**
Became industrially diversified	39	-0.001	0.018	-0.158**	-0.100**
Ceased industrial diversification	86	-0.136***	-0.201***	0.199***	0.131***

Panel C: 1989-1993

Became globally diversified	168	0.180***	0.182***	-0.106***	-0.110***
Ceased global diversification	50	-0.037	0.026	0.018	-0.009
Became industrially diversified	48	0.026	0.000	-0.230***	-0.202***
Ceased industrial diversification	73	-0.023	0.002	0.154***	0.175***

^a This represents the number of firms for which we are able to calculate a change in excess value.

***, **, and * denote significance at the 0.01, 0.05, and 0.10 level, respectively.

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