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Corporate Diversification and Stock Returns

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CORPORATE DIVERSIFICATION AND STOCK RETURNS

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ABSTRACT

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There are considerable empirical evidences in favor of and against the corporate diversification. A number of previous studies have found that industrial and geographic diversification have a negative effect on the value of the firm and the stock returns. In contrast, a growing stream of literature provides evidence in support of the diversification premium. There is no consensus on whether the documented discount can be attributed to corporate diversification per se or to the firms' characteristics other than diversification. In this study, we re-examine the impact of industrial and/or geographic diversification on the stock returns.

The investigation of the comprehensive sample of publicly traded firms over the last 20 years reveals that industrially diversified firms do not under-perform. While they are systematically different from single-segment firms, we did not uncover any abnormal performance that can be attributed to the industrial diversification per se. In addition, we find evidence in support of the previous studies about the beneficial effect of geographic diversification. Our results suggest that, in 1990s, industrially focused firms with operations abroad were rewarded more than purely domestic firms. This result is robust to the model specification and does not change whether the four-factor model or the characteristic-based model is used.

However, the examination of corporate diversification events – mergers and acquisitions – reveals different picture with respect to industrial diversification. Our results suggest that acquisitions of independent firms outside of existing lines of business have a negative effect on shareholder value. Annual average buy-and-hold abnormal returns for firms acquiring targets in unrelated lines of business is about 15% more negative than that of firms acquiring targets in related lines of business. Pre-merger targets' performance or differences in firm-specific characteristics cannot explain this post-merger return difference. Moreover, post-merger return changes cannot be explained by mergers' characteristics, such as transaction size, method of payment or acquisition premia. Furthermore, examination of cumulative monthly abnormal returns reveals that although acquiring firms in both related and unrelated mergers experience post-merger returns decline, the performance of unrelated firms deteriorates much faster in unrelated than in related acquisitions.

The overall results can be summarized as follows. Corporate diversification changes the nature of the firm. Not only the composition of the firm becomes different, the overall firm's risk characteristics change. Thus, corporate diversification has an impact on firm value through changes of the firm's characteristics. Moreover, corporate diversification per se becomes an important firm characteristic that affects stock returns in addition to other firm-specific characteristics.

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I dedicate this Dissertation to my son, Dmitri. Without his endless support and encouragement this work would not have been possible.

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1. INTRODUCTION

A number of studies (see Lang and Stulz (1994), Comment and Jarrell (1995), Berger and Ofek (1995, 1996), and Servaes (1996), among others) have found that industrial diversification has a strong negative effect on the value of the firm. Furthermore, consistent with the diversification discount literature, Dennis, Dennis and Yost (2002) present new evidence that even global diversification leads to the significant value loss. In contrast, a growing stream of literature provides evidences in support of the diversification premium and questions the diversification discount studies on the grounds of incorrect econometric methodology, improper matching technique, selection bias, endogenety problems, differences in leverage etc. (Hubbard and Palia (1999), Matsusaka (1993, 2001), Chevalier (2000), Villalonga (2000), Whited (2001), Campa and Kedia (2002), Mansi and Reeb (2002), Maksimovic and Phillips (2002), Schoar (2002)). Thus, there is no consensus on whether corporate diversification destroys value or whether it is the optimal business strategy, which depends on the specific firms' characteristics and time.

Several hypotheses were advanced in the literature in order to explain the diversification discount. One hypothesis attributes the discount to the value-destroying effect of inefficient internal capital markets (Lamont (1997), Shin and Stulz (1998), Rajan, Servaes and Zingales (2000)). Another explains the discount by the agency problem (Jensen (1986), Stulz (1990), Dennis, Dennis and Sarin (1997), May (1995), Agarwal and Samwick (2002), Anderson, Bates, Bizjak and Lemmon (2000)). Furthermore, other researchers have argued that industrial diversification discount can

be partially explained by differences in the required returns (Lamont and Polk, 2002), by geographic diversification (Bodnar, Tang and Weintrop (1999), Dennis, Dennis and Yost (2002)), or by low value of the acquired business (Graham, Lemmon, and Wolf (2002)). However, neither hypothesis provides a complete explanation of why conglomerates are valued less relative to specialized firms.

A negative relation between corporate diversification and firm value suggests that stock returns of diversified firms should be affected as well. Consistent with diversification discount literature, Comment and Jarrell (1995) document negative abnormal returns associated with increase in diversification. However, in the multivariate pooled time-series cross-sectional regression that investigates the relation between stock returns and changes in the degree of focus, the coefficient estimate for focus change is reliably positive only in the presence of accounting performance variables. In contrast, Graham, Lemmon, and Wolf (2001) find acquiring firms' stocks experience positive abnormal returns around the announcement of diversifying acquisition, indicating market views these acquisitions as value enhancing. In addition, 12-months buy-and-hold returns after diversifying acquisition is not statistically and economically different from zero.

Lamont and Polk (2001) find that not all diversified firms are traded at a discount. Moreover, the diversification discount varies with returns. However, difference in expected returns explains only about 50% of the discount. Furthermore, the diversification discount is hard to reconcile with findings of positive abnormal returns to diversifying acquisitions (Kaplan and Weisbach (1992), Matsusaka (1993),

Hubbard and Palia (1999), Chevalier (1999)). Thus, the empirical evidences on whether corporate diversification is sub-optimal business strategy are inconclusive.

In this study, we analyze stock returns of diversified versus specialized firms in an attempt to solve this puzzle. First, we concentrate on the long-term stocks performance of diversified versus specialized firms. With respect to expected stock returns, low market valuation (low Tobin's q or high book-to-market ration) of diversified firms implies risk differential, mispricing, or corporate diversification being a significant firm characteristic affecting value and stock returns.

Fama and French (1992, 1993, 1996) argue that three-factor model explains stock return variations. At the same time, a number of recent studies documents that some firm-specific characteristics systematically affect expected stock return (Daniel and Titman (1997), Titman, Wei and Xie (2001), Gompers, Ishii and Metrick (2001)). These findings combined with persistent effect of the corporate diversification on prices, which could not be unambiguously explained by previous research, imply that corporate diversification may have explanatory power in addition to risk factors commonly used in finance literature. While we do not directly test the factor-pricing model against the characteristic-based model, we employ both approaches in order to compare stock returns of diversified firms with that of specialized firms.

Second, to address the issue of causality, we focus on diversifying event. We examine a smaller sample of firms that diversified their operations through mergers and acquisitions. We compare combined performance of the target and the bidder before the merger with subsequent performance of the merged entity after the merger has been completed. In order to test the impact of corporate diversification on the subsequent

performance of the acquiring firm we compare unrelated (diversifying) mergers to the mergers in the same line of business.

This study contributes to the corporate diversification literature in several ways. First, we investigate the value of the corporate diversification from investors' perspective and use a methodology different from that of other studies. We form portfolios based on whether a firm reports operations in one line of business or more than one line of business and test their performance over the subsequent 12 months. We do not rely on the matching technique of Berger and Ofek (1995), because single-segment firms are different from segments of diversified firm in many dimensions (Villalonga, 2000). Instead, we try to determine the impact of corporate diversification on the stock return-generating process, while controlling for risk and firm's characteristics.

Second, we address the puzzling finding of geographic diversification discount by Dennis et al (2002). Previous research in the international finance literature suggests that multinationality is valuable, at least in the presence of intangible assets and/or multinational networks (Doukas and Travlos, 1988; Doukas, 1995; Morck and Yeung, 1991,1998; Doukas and Patzalis, 1999). However, two recent studies of Bodnar, Tang and Weintrop (1999) and Dennis, Dennis and Yost (2002) report contradictory results. While Bodnar, Tang and Weintrop (1999) have found that geographic diversification increases firm value, Dennis, Dennis and Yost (2002) demonstrate that geographic diversification is associated with significant value-reduction. Applying different approach, we investigate the impact of geographic diversification on the shareholders' wealth.

Third, we examine the effect of the corporate diversification at the time of diversifying event. In this study, we follow real investment strategy and avoid pitfalls associated with benchmark construction by comparing pre-merger and post-merger performance. While result of this investigation is limited to acquisitions of stand-alone firms, it has important implications for assessment of managerial merger decisions with respect to shareholders' wealth.

The investigation of a comprehensive sample of publicly traded firms over the last 20 years reveals that industrially diversified firms do not under-perform. While they are systematically different from single-segment firms, we do not find any abnormal performance that can be attributed to industrial diversification per se. In addition, we find evidence in support of the previous studies about beneficial effect of geographic diversification. Our results suggest that, in 1990s, industrially focused firms with operations abroad have significantly higher returns than that of purely domestic firms.

The investigation of firms' performance around diversifying event reveals that acquisitions of stand-alone firms from unrelated lines of business have a negative effect on the subsequent stock performance of the acquiring firm. While firms in both categories of mergers (related and unrelated) exhibit negative post-merger abnormal returns (consistent with previous findings of Agrawal, Jaffe, and Mandelker (1992)), performance of firms that acquire targets from unrelated lines of business declines more rapidly. Moreover, one year after the merger completion, abnormal stock returns of firms that acquired targets from unrelated lines of business is 15% more negative than that in related mergers. Pre-merger targets' performance and differences in firm-specific characteristics cannot explain this post-merger return difference. This result is not

consistent with that of Graham, Lemmon, and Wolf (2002). Moreover, post-merger return changes cannot be explained by mergers' characteristics, such as transaction size, method of payment or acquisition premia.

However, this result cannot be unambiguously interpreted as evidence of negative effect of corporate diversification. Regression analysis indicates that corporate diversification is not the major factor explaining poor post-merger performance. While statistically significant, diversification explains only 1% of the change in post-merger return changes in comparison to 41% explained by bidders' pre-merger returns. This result is more consistent with overconfidence hypothesis (Roll (1986)). Managers of firms that experience superior pre-merger performance are overconfident in their appraisal of future merger benefits. Our results are also consistent with studies that document long-term post-event under-performance and returns mean reversal (Agrawal, Jaffe, and Mandelker (1992), Lakonisok, Shleifer, and Vishny (1994)).

The rest of this study is organized as follows. Section 2 presents review of corporate diversification literature. The investigation of long-run stock returns performance is presented in Section 3. Section 4 addresses the impact of corporate diversification at the time of diversifying event. Section 5 concludes this study.

2. TWO DIMENSIONS OF CORPORATE DIVERSIFICATION DISCOUNT PUZZLE

Corporate diversification has two dimensions. One dimension, that received much attention in the corporate finance literature, is industrial diversification. Another dimension is determined by whether a firm is domestic or geographically diversified. In this section, we discuss each of these dimensions and their implications for firms' performance.

2.1. Industrial Diversification Puzzle

Theoretically, there are as many arguments for the negative impact of industrial diversification as for the positive one. Weston (1970) and Williamson (1975) argue that industrial diversification benefits shareholders because it reduces the negative impact of information asymmetry between managers and external capital markets. Therefore, managers are able to monitor firms' operations and allocate resources more efficiently. In addition, diversification may lower firm's risk, increase debt capacity, and lower taxes due to imperfectly correlated cash flows (Lewellen (1971)). From the stakeholders' perspective, diversification may be valuable because it induces employees, customers and suppliers to make firm-specific investments, which leads to higher rents to equity-holders (Wang and Barney (2001)).

Alternatively, diversification may be the outcome of the agency problem of free cash flow (Jensen (1986)). Managers may want to diversify their personal portfolio at the expense of the shareholders (Amihud and Lev (1981)), or they become entrenched

and diversify the firm's operations in the directions that match their own skills the most (Shleifer and Vishny (1989)). Internal capital markets, that are presumably created to overcome the problems of information asymmetry and under-investment, can be run inefficiently and result in a waste of resources (Lamont (1997), Shin and Stulz (1998), Rajan, Servaes and Zingales (2000)) and/or internal power struggle (Rajan, Sevaes, and Zingales (2000)).

Yet anther body of literature argues that, depending on the some firm-specific characteristics and/or time period, corporate diversification may be the optimal corporate strategy. For example, Hubbard and Palia (1999) argue that information efficiency of the external capital markets changes over time leading to changes in the value of diversification. Matsusaka (2001) develops a dynamic model in which diversification is a value-maximizing strategy because it maximizes firms' organizational capabilities. In addition, Maksimovic and Phillips (2002) develop a model, in which firms move into other industries in search of investment opportunities when returns within their original industry diminishes.

Empirical evidences to date are inconclusive. Several studies document the robust diversification discount. Lang and Stulz (1994) show that Tobin's q of diversified firms is lower on average than that of focused firms for the 1978 – 1990 period. Moreover, they find a negative relation between Tobin's q and degree of diversification. Industry adjustment reduces the discount but does not eliminate it. Researchers conclude that shareholders will be better off if diversified firms were broken down into separate entities. However, they acknowledge that their approach relies on the assumption that the stand-alone q of divisions of conglomerates is well

approximated by the average q of the specialized firms in the same industry. Additionally, if diversifying firms perform poorly before the act of diversification, it may be valuable ex ante, but loses its value due to technological and institutional changes. Following this line of research Servaes (1996) tested the hypothesis that benefits of diversification could have changed over time. However, he finds that diversified firms were traded at a discount even in the 1960s and to some extent in the 1970s. Using the excess market value measure, Berger and Ofek (1995) confirm that, in the 1980s, diversified firms were traded at a discount relative to the industry benchmark. They also refine the matching technique, which become routinely used in most of the diversification discount studies. It should be noted however, that their matching technique relies on the assumption that single-segment firms are directly comparable to divisions of multi-segment firms.

Furthermore, Comment and Jarrell (1995) found a trend to a greater focus over 1979-1988. Moreover, they document that firms with increased focus subsequently earn positive abnormal returns, while firms that have increased the degree of diversification earn negative abnormal returns. One of the drawbacks of their approach is that they calculate the abnormal returns relative to equally weighted market index. It has been documented that abnormal performance is often sensitive to the benchmark methodology. It tends to disappear when one uses value-weighted market portfolio and makes adjustments for common risk factors, such as size and book-to-market (Fama and French (1996, 1998), Brav and Gompers (1997)).

Not all diversified firms are traded at a discount. Lamont and Polk (2001) document that, while diversified firms are discounted on average, about one third of

them are premium firms. They found that the variation of diversification discount could be partially explained by differences in expected returns. Discount firms have higher expected returns while premium firms have lower expected returns. However, they find that on average diversified firms have the same returns as the portfolio of comparable single-segment firms. This finding is puzzling. If average diversified firm trades at a discount and the excess value varies with returns, one should expect that returns on the portfolio of diversified firms would differ from returns on the portfolio of single-segment firms.

In an optimal firms' behavior framework, Campa and Kedia (2002) find that diversification discount turns into a premium when other firm's characteristics are accounted for. They document that diversified firms trade at a discount during nine to twenty years around the diversification decision. Therefore, it is hard to assert unambiguously that it is the diversification per se that gets discounted.

Contrary to the diversification discount literature, Schoar (2002) finds that plants of diversified firms are more productive in comparison to focused firms. Using different methodology Villalonga (2000) finds that diversification discount is sensitive to the matching technique. With different methodology, the discount disappears and even turns into a premium. She concludes that the discount is not a diversification effect. Since diversified firms are different in many dimensions, constructing an adequate benchmark may be problematic and can lead to spurious results.

While studies based on profitability and excess market value have been inconclusive, researchers that employ the event-study methodology also document conflicting results. Morck, Shleifer and Vishny (1990) document negative market

reaction to unrelated acquisitions. However, Kaplan and Weisbach (1992) found positive total returns to diversifying acquisitions, implying an overall positive effect. Matsusaka (1993), Hubbard and Palia (1999), and Chevalier (2000) find positive market reaction to announcements of diversifying acquisitions. These latter findings are hard to reconcile with studies that report diversification discount and higher returns to specialization. Furthermore, Graham, Lemmon and Wolf (2002) find that units added to conglomerates are traded at a discount before they are acquired, but buy-and-hold abnormal returns of diversifying firms are positive.

2.2. Multinationality and Diversification Discount

When a firm extends its operations abroad it may increase the firm value due to internalization of intangible assets (Caves (1971) and/or multinational networks (Kogut and Zander (1983), Kogut (1985)). It may be also value destroying, as geographically diversified firms become difficult to monitor (Bodnar, Tang, and Weintrop (1999)). Previous empirical research tends to support the value-increasing impact of geographic diversification (Erunza and Senbet (1981, 19984), Doukas and Travlos (1988), Doukas (1995), Morck and Yeung, (1991,1998), Doukas and Pantzalis (1999)). However, recently Bodnar, Tang and Weintrop (1999) and Dennis, Dennis and Yost (2002) obtained contradictory results. While Bodnar, Tang and Weintrop (1999) have found that geographic diversification increases the firm value, Dennis, Dennis and Yost (2002) demonstrate that geographic diversification is associated with significant value reduction.

Bodnar, Tang and Weintrop (1999) suggest that a large part of the diversification discount uncovered by previous studies arise primarily from the failure to account for geographic diversification. They examine the combined effect of industrial and geographic diversification and documented that a failure to control for geographic diversification leads to biased estimates of the effect of industrial diversification. In addition, after controlling for industrial diversification, they confirm previous findings of positive value effect of geographic diversification. However, when Dennis, Dennis and Yost (2002) added other firms' characteristics to the analysis they found negative value effect of global diversification.

Thus, the corporate diversification discount puzzle has two dimensions. One is the industrial diversification discount and the other is the geographic diversification discount. Therefore, in our investigation of the stock performance we account for both industrial and geographic diversification.

3. CORPORATE DIVERSIFICATION AND LONG-TERM STOCK RETURNS

3.1. Introduction

In this section, we compare average realized stock returns of diversified firms to those of specialized firms. If corporate diversification destroys value then, after adjustment for risk characteristics, a portfolio of single-segment firms should consistently outperform a portfolio of multi-segment firms in the long run. Fama and French (1992, 1993) show that cross-sectional relation between stock returns and expected earnings can be captured by three risk factors, that is excess market returns, size, and book-to-market ratio. Carhart (1997) adds another factor that captures the effect of one-year momentum on stock returns. Therefore, in order to adjust for risk sensitivity we use the four-factor linear model that includes three factors developed by Fama and French (1992, 1993) and fourth factor proposed by Carhart (1997).

However, Fama-French procedure requires a formation of portfolios and suppresses the possible effect of firms-specific characteristics on stock returns. In order to test whether corporate diversification has an effect on stock returns in addition to other common firms' characteristics, we apply the characteristic-based model (Daniel and Titman (1997), Brennan, Chordia and Subrahmanyam (1998)). We employ Fama-MacBeth (1973) methodology and use recent work of Brennan, Chordia and Subrahmanyam (1998) as a guide to define relevant firm characteristics, in addition to those identified by the previous research of corporate diversification.

3.2.Data

3.2.A. Sample Selection and Portfolio Formation Procedure

At the end of June of each year (1981-2000) all NYSE/AMEX/NASDAQ firms are allocated into two portfolios according to the number of reported segments by SIC code: portfolio of single-segment firms or portfolio of multi-segment firms. In the past, researchers used the number of segments operating in industries with different 4-digit SIC codes to classify firms as diversified or focused (Lang and Stulz (1994), Lamont and Polk (2001), Bodnar, Tang and Weintrop (1999), Dennis, Dennis and Yost (2002)). However, the classification by 4-digit SIC code may be misleading in that we would classify firms as diversified when, in fact, they operate in closely related industries. On the other hand, using 3 digit (or lower) SIC code may result in the misclassification of the opposite nature (Villalonga (2000)). Therefore, we perform all our tests using 4, 3, 2, and 1-digit SIC codes.

Another common measure of industrial diversification is the sales or assets based Herfindahl index. We do not use Herfindahl index because it measures the *degree* of diversification. For our purposes we need only to classify firms as focused or diversified. Since firms, which we classify as single-segment, have sales generated by only one segment, the Herfindahl index for these firms always equals one. All other firms are classified as multi-segment firms regardless of their degree of diversification. Therefore, classification based on Herfindahl index will lead to the same results and is redundant.

The data on number of segments are collected from COMPUSTAT research and active files at the fiscal year ending year $t = -1$ relative to portfolio formation year $t = 0$.

Segment is defined by reported operations and sales in the same SIC code. If a firm reports operations and sales in several segments with the same SIC code, these segments are treated as one. Firms that report sales generated by only one segment are classified as single-segment firms. Firms with two or more segments are classified as multi-segment firms. Firms with segments in 1-digit SIC code of 0, 6 or 9 are excluded.

Previously, researchers have excluded from the analysis those firms that report less than $20 millions in consolidated sales (Berger and Ofek (1995, 1996), Dennis, Dennis and Yost (2002)), less than $30 millions in sales (Bodnar, Tang and Weintrop (1999)), or less than $100 millions in assets (Lang and Stulz (1994)). The purpose of this requirement is to mitigate the problem of comparing very small segments with much larger focused firms (Dennis, Dennis and Yost (2002)). However, since in our study we do not employ the matching technique and use returns as the performance measure, our only concern is the possible distortions from firms in the early development stage, such as biotech, internet, etc. Therefore, we exclude firms with less than $10 millions in sales as in Titman, Wei and Xie (2001).

In addition to being classified as single-segment or multi-segment, all firms in our sample are independently sorted into portfolios according to reported foreign sales as a fraction of total sales. This COMPUSTAT item sums Net Geographic Sales for the set of all geographic segments with a Geographic Segment Area Code of 98 (all foreign segments), and divides it by Net Sales. Firms that report percent of foreign sales greater than 10% of the firm's total sales are classified as geographically diversified. Firms that report no foreign sales or less than 10% of foreign sales of the firm's total sales are classified as domestic. Our requirement of at least 10% of total sales generated by

foreign operations is conservative. The reason is that under the disclosure requirements of Statement of Financial Accounting Standard #14 (Financial Accounting Standard Board 1976) firms must report sales, income or assets for foreign operations if they account for at least 10% of the firm's total sales, income or assets. Some firms report these figures even if foreign sales are less than 10 % of the total sales. However, we cannot identify firms that do not report sales, income, and assets from foreign operations, which are less than 10% of the firm's total. Therefore, we use 10% foreign sales as a cut off point for our classification.

3.2.B. Diversification Trend

Table 1 shows the distribution of the number of single-segment and multi-segment firms in each of the portfolio-formation year from 1981 to 2000. We discuss our results for the 4-digit SIC code classification with the results for 2-digit SIC code classification reported in brackets for comparison.

In our sample, the average number of firms per year is 3076, of which 913 [752] are the multi-segment firms (roughly 30% [24%] of the total number of firms) and 2162 [2323] are single-segment firms. However, from year to year, the number of multi-segment firms as a percent of the total number of firms has declined dramatically. In 1981, with the number of multi-segment firms was 52% [44%] of the total sample; by 1998 this number declined to 17% [13%]. In the past, researchers attributed this decline to the disciplinary effect of the market for the corporate control (Comment and Jarrell (1995), Berger and Ofek (1996), Dennis, Dennis and Yost (2002)). However, in 1999, we observe the increase in number of multi-segment firms to 26% [20%]. Actually, the

increase in industrial diversification began even earlier since the 1999 portfolio consists of firms that report the number of segments in 1998 fiscal year.

< Insert Table 1 about here >

Table 2 presents the distribution of firms in our sample in portfolios formed by intersection of industrial and geographic classifications in each portfolio formation year from 1981 to 2000. For domestic and geographically diversified firms alike, the percent of multi-segment firms has declined over the 1981-1998 period and started to increase in 1999. It suggests that geographic diversification is not a substitute for industrial diversification. While the level of industrial diversification is higher for geographically diversified firms, the trends in both groups are similar. This finding suggests that neither domestic nor geographically diversified firms' samples drive our previous results of diversification trend reversal.

< Insert Table 2 about here >

Our finding of the trend reversal has interesting implications. If corporate diversification destroys value and markets are efficient (although adjusting slowly) we should observe a continuation of the trend toward a greater focus. Why then market forces not just fail to eliminate presumably inefficient value-destroying diversified firms but actually encourage a grater diversification in the late 1990s? Alternatively, if markets are efficient then increase in corporate diversification indicates that corporate

diversification per se may not be harmful to the shareholders' value, at least in the late 1990s.

3.2.C. Portfolios Characteristics

Table 3 presents the summary statistics. Panel A shows the average number of firms, size, and book-to-market ratio; Panel B presents debt to total assets, capital expenditures to sales, EBIT to sales ratios, and dividend yield. We report summary statistics for portfolios that account for industrial diversification and geographic diversification separately and jointly for the whole 1981-2000 portfolio formation period and for two sub-periods: 1981-1990 and 1991-2000 that represent 1980s and 1990s, respectively.

Size and book-to-market ratio are calculated using the Fama-French (1992, 1993) methodology. Size is the market capitalization of the firm at the end of June of portfolio formation year t obtained from CRSP. Book-to-market ratio is calculated as follows: BE/ME, where BE is the COMPUSTAT book value of stockholders' equity (item A216), plus deferred taxes (item A126) and investment tax credit (item A208) (if available), minus the book value of preferred stock. The book value of preferred stock is estimated, depending on the availability, using redemption (item A56), liquidating (item A10), or par value (item A130) (in that order). BE is calculated for the fiscal year ending in calendar year t-1. Firms with negative BE are excluded from the sample. ME is the market capitalization of the firm at the end of December of calendar year t-1. Size and book-to-market breakpoints for each year are those of Fama and French (1992, 1993) and are obtained from K. French's web page. For each classification portfolio we

report the average number of firms, firms' size, and book-to-market ratio, averaged across firms for each year and then averaged over the years in each time period.

The majority of firms in our sample fall in the single-segment/domestic category. The average number of multi-segment/geographically diversified firms per year is only 287 [233] out of 3076 or 9.3% [7.6%]. Although geographically diversified firms account for 25% of the sample on average, the majority of these firms are single-segment firms. Over time, the average number of geographically diversified firms has increased from 630 (23.9%) in the 1980s to 918 (26.1%) in the 1990s. However, due to the declining trend of industrial diversification, the average number of multi-segment/geographically diversified firms fell from 304 [253] (11.5% [9.6%]) to 269 [214] (7.7% [6.1%]) over the same period.

Largest firms in our sample are geographically diversified firms, with multi-segment geographically diversified firms having market capitalization over $4 billion on average in the 1990s. Even single-segment geographically diversified firms are two times larger than domestic multi-segment firms are. Thus, both industrial and geographic diversification contributes to firms' size increase. This observation has important implications for our further analysis of the stock returns since it has been long documented in the literature that smaller firm size can lead to higher returns (Fama and French (1992, 1993, 1996)).

< Insert Table 3 about here >

Consistent with previous findings that diversified firms have lower q-ratio (Lang and Stulz (1994)), multi-segment firms have higher book-to-market ratio. Additionally,

domestic firms tend to have higher book-to-market ratios. Since high book-to-market stocks usually have higher returns, we expect to observe this pattern when portfolios stock returns are examined.

Debt to total asset ratio is obtained from COMPUSTAT and is defined as the sum of long-term debt (item A9) and debt in current liabilities (item A34), divided by total assets (item A6), which represent the sum of current assets, net plant, and other non-current assets. Over the total period and in each sub-period, the debt to assets ratio of multi-segment firms is higher than that of single-segment firms, consistent with Lewellin (1971) argument that diversified firms have higher debt capacity in comparison to focused firms. The pattern is the same for both domestic and geographically diversified firms' samples. However, domestic firms have higher debt ratios in comparison to geographically diversified firms. Overall, single-segment/geographically diversified firms have the lowest debt to assets ratio, while multi-segment/domestic firms have the highest.

It is frequently argued that small single-segment firms have difficulty raising external capital and suffer from under-investment and sub-optimal growth (Myers and Majluff (1984)). However, large diversified firms may over-invest because cash earned by well-performing segment can be used to subsidize poorly performing divisions or to expand business beyond the optimal size (Jensen (1986), Lamont (1997), Shin and Stulz (1998), Rajan, Servaes and Zingales (2000)). Therefore, we should expect to find higher degree of capital expenditures by diversified firms in comparison to the focused firms. However, we observe just the opposite. Single-segment firms consistently invest more. This finding is not consistent with over-investment argument.

Moreover, Titman, Wei and Xie (2001) document that firms with higher capital expenditures under-perform, on the risk-adjusted basis, in comparison to those with low capital expenditures. The fact that diversified firms do not invest more in comparison to focused firms cast a serious doubt on the argument that corporate diversification usually associates with or leads to over-investment.

EBIT to sales ratio measures profitability of the firm. We do not find a significant difference in profitability across firms and over time. One exception is low profitability of the single-segment/domestic firms in the 1990s. However, these are the smallest firms, which also have the highest capital expenditures. Therefore, although we excluded very small firms (less than $10 million in sales) our sample may still contain a large number of new firms in the early stages of their development and rapid growth. This also may explain why single-segment firms in our sample pay lower dividends in comparison to multi-segment firms.

The investigation of portfolios' characteristics reveals that diversified firms differ from specialized firms in many dimensions. This finding is important for two reasons. First, it indicates that diversified and specialized firms are not comparable without an adjustment for these differences because it has been previously documented that some firm-specific characteristics systematically affect stock returns (Daniel and Titman (1997), Brennan, Chordia and Subrahmanyam (1998)). Second, previous research suggests that firm characteristic such as degree of industrial and/or geographic diversification may have explanatory power in addition to risk factors commonly used in the finance literature. For example, Titman, Wei and Xie (2001) find that higher capital investment activity of a firm is associated with negative abnormal returns.

Gompers, Ishii and Metrick (2001) uncovered strong negative relation between corporate governance provisions related to takeover defense, abnormal stock returns, and firm value.

3.3. Portfolios' Returns

If corporate diversification destroys value (Lang and Stulz (1994), Berger and Ofek (1995, 1996), Servaes (1996), Dennis, Dennis, and Yost (2002)) and there is a premium for specialization (Comment and Jarrel (1995)), investment in a portfolio of single-segment firms should earn higher returns in comparison to the investment in a portfolio of multi-segment firms. To investigate this hypothesis we calculate various measures of returns on the corresponding portfolios (Table 4). We report average monthly raw returns, average monthly abnormal returns, buy and hold abnormal returns, and cumulative abnormal returns. Average monthly raw returns are returns on the value-weighted corresponding portfolio. Average monthly abnormal returns are the portfolio raw returns less the value-weighted market portfolio returns. The abnormal buy and hold returns are the monthly returns compounded over the one-year holding period less the buy and hold returns on the market. Cumulative abnormal returns are the sum of monthly returns over the one-year period less the cumulative market returns over the same period. Market portfolio consists of all NYSE/AMEX/NASDAQ firms in CRSP database.

We use non-parametric Wilcoxon signed-ranks test for groups of two series and Kruskal-Wallis test for groups of four series to test the significance of the difference among median returns on portfolios. Although, consistent with Bodnar, Tang and

Weintrop (1999) and the previous literature on the value of multinationality, geographically diversified firms in the 1980s in multi-segment category and geographically diversified firms in the 1990s in single-segment category seem to have somewhat higher returns, we do not observe any statistically significant difference among all measures of portfolio returns. This observation is not consistent with diversification discount literature because if diversification destroys value we should observe differences in stock performance.

One explanation for this lack of stock return differential is that firms' characteristics such as size and book-to-market have an impact on the stock returns in the opposite directions, thus offsetting each other. For example, single-segment firms are smaller, which leads to higher returns. However, they also and have lower book-to-market ratios (high prices in comparison to book value of stocks), meaning that they should have lower returns. These two trends work in opposite directions. Therefore, we may not observe any dramatic differences in the returns of single-segment and multi-segment firms.

< Insert Table 4 about here >

3.4. Four-Factor Model

3.4.A. Methodology and Hypotheses

If corporate diversification affects firms' performance, this relation should be incorporated in the stock prices. To the extent that investors anticipate performance changes associated with diversification the price adjustment is quick, and subsequent realized returns should not be systematically different from expected returns on a passive portfolio with similar risk factors sensitivities. To account for common risk factors, we employ Carhart (1997) four-factor model that extends the Fama-French (1992, 1993) three-factor model by adding a momentum factor.

We estimate the following regressions:

$$R_i - R_f = a_i + b_i(R_m - R_f) + s_i\,SMB + h_i\,HML + m_i\,MOMENTUM + \epsilon_i \quad (1)$$

where $(R_i - R_f)$ are monthly excess returns on the value-weighted portfolio of firms in the portfolio in question, R_f is the monthly Treasury bill rate, $(R_m - R_f)$ are value-weighted excess market returns on all NYSE/AMEX/NASDAQ firms. SMB (small minus big) is the difference between the monthly returns on small firms and big firms. HML (high minus low) is the difference between monthly returns on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. MOMENTUM is the a momentum factor, constructed from six value-weight portfolios formed using independent sorts on size and prior return of NYSE, AMEX, and NASDAQ stocks. It is the average of the returns on two (big and small) high prior return portfolios minus the average of the returns on two low prior return portfolios. Prior return is measured from month -12 to -2. All factors' definitions and returns, including momentum factor, can be obtained from Kenneth French's web page.

Low valuation of diversified firms in comparison to focused firms implies that investors anticipate poor performance of diversified firms. Factor-pricing model predicts that low-value firms should earn high ex post returns due to positive loading on the value factor (HML), after controlling for market risk, size, and momentum. Moreover, the returns on zero-investment portfolio, which takes a long position in specialized firms' stocks and a short position in diversified firms' stocks, should have significantly negative loading on the value factor (HML).

Systematic size differences between diversified and specialized firms should be captured by size factor (SML). Diversified firms are usually larger than specialized firms are. Fama and French (1992, 1993) document that small firms earn higher returns due to the positive loading on size factor (SML). To the extent than specialized firms are smaller than diversified firms we expect that returns on zero-investment portfolio should have significantly positive loading on SML.

However, the portion of stock returns difference between diversified and specialized firms that is not related to risk differential should be captured by regressions' intercepts (similar to Jensen's alpha). If market, size, book-to-market, and momentum factors capture common risk differences, the intercept can be interpreted as abnormal returns arising from the differences in degree of diversification. If diversified firms systematically under-perform specialized firms on the risk-adjusted basis we should observe significantly positive intercept in zero-investment portfolio regressions.

Moreover, if diversification is a significant factor that determines stock returns we should find significantly positive intercept in regressions run only on specialized firms and significantly negative intercept in regressions run only on diversified firms. In

order to investigate this hypothesis further and to test the hypothesis of all intercepts being jointly zero we calculate Wald χ^2-statistic and Gibbons, Ross and Shanken (1989) F(GRS)-statistic.

To calculate F(GRS), we follow Fama and French (1993) procedure. First, all firms in our sample are independently sorted into portfolios according to the industrial and geographic diversification. Next, firms are independently allocated into portfolios according to their size (market capitalization at the end of the previous fiscal year) and book-to-market ratios (at the end of the previous fiscal year). Firms with the market capitalization at the end of the previous fiscal year in the lowest two quintiles are classified as "Small", in the upper two quintiles are classified as "Large", the middle 20 percent are the "Medium". Book-to-market classification is done in the same manner. We aggregate two lowest and two highest quintiles due to the limitations of our sample. The intersection of these classifications (industrial and geographic diversification, size and book-to-market) result in 36 portfolios - nine portfolios per each diversification classification.

F(GRS) is calculated for each diversification category as follows:

$$F(GRS) = (A' \Sigma^{-1} A)(N - K - L + 1)/(L * (N - K)*w) \quad (2)$$

where N is the number of time series observations, L is the number of regressions K is 1 plus the number of explanatory variables in the regression, A is the column vector of regression intercepts, Σ (L x L) is the covariance matrix of the residuals from regressions, and w is the diagonal element of $(X'X)^{-1}$ corresponding to the intercept. F(GRS) has an F-distribution with L and (N – K – L +1) degrees of freedom (Gibbons, Ross, and Shanken (1989)).

If corporate diversification has a significant impact on stock returns in addition to required returns, Wald χ^2-statistic and F(GRS)-statistics should be significantly different from zero.

3.4.B. Results

Table 5 reports regression results for industrial diversification only. Results are reported for two industrial classifications - by 4-digit SIC and by 2-digit SIC codes (in brackets).

Considered separately, single-segment firms earn statistically significant monthly abnormal returns. When examined in each sub-period, the positive abnormal performance of specialized firms stems entirely from their superior performance in the 1990s. In this period, the abnormal average monthly returns of the portfolio of specialized firms are 0.22% [0.21%], statistically significant at 5% level. The only indication of abnormal performance of multi-segment firms is statistically significant positive intercept in the 1980s. However, this result is weak. It is statistically significant only at 10% level and the result holds only for 4-digit SIC classification.

When we compare performance on multi-segment firms to that of specialized firms, first thing to note is that intercept of the zero-investment portfolio in not statistically significant. This result holds for the whole period and for the two sub-periods. Thus, the regression results do not support the hypothesis that industrially diversified firms under-perform focused firms.

When we examine the loadings on factors, it is apparent that in the 1980s, there are no differences in terms of risk between single-segment and multi-segment firms, as

indicated by insignificant coefficients on all factors in the zero-investment portfolio. All factor-lading differences occur in the 1990s, indicated by statistically significant coefficients of SMB, HML, and MOMENTUM variables of zero-investment portfolio regression.

As pointed out earlier, single-segment firms are smaller than multi-segment firms are. Therefore, single-segment firms load positively on the size factor while multi-segment firms load negatively. With respect to loading on the value factor (HML), the results are surprising. Consistent with lower book-to-market ratio returns of single-segment firms load significantly negatively on HML. However, returns of multi-segment firms do not load positively on HML although they have higher book-to-market ratio. Thus, there is no indication that the value factor plays any significant role in determining the returns for the multi-segment firms.

Results in Table 5 suggest that, while there is evidence of the premium to specialization in the 1990s, we cannot assert that in the last 20 years industrial diversification was harmful to investors. This result is not consistent with the prior literature on the value-destroying impact of industrial diversification (Lang and Stulz (1994), Comment and Jarrell (1995), Berger and Ofek (1995, 1996), and Servaes (1996)).

< Insert Table 5 about here >

Table 6 reports regression results for portfolio of domestic firms versus portfolio of geographically diversified firms. Geographically diversified firms earn abnormal returns for the whole period of 1981-2001 and for each sub-period. Moreover, the

magnitude and significance of the abnormal returns have increased over time. In the 1990s, the intercept is two times of that in the 1980s. At the same time, the intercept for the portfolio of domestic firms is not statistically different from zero. Thus, this result is a strong evidence of positive impact of geographic diversification consistent with the prior literature on the value of multi-nationality (Doukas and Travlos (1988), Doukas (1995), Morck and Yeung (1991,1998), Doukas and Pantzalis (1999), Bodnar, Tang and Weintrop (1999)).

< Insert Table 6 about here >

Prior research (Bodnar, Tang and Weintrop (1999), Dennis, Denis and Yost (2002)) indicates that industrial and geographic diversification have to be considered jointly. Results of regression analysis, that takes into account both industrial and geographic diversification, are reported in Table 7.

When the sample of domestic firms is divided into single-segment and multi-segment firms, neither displays abnormal performance (statistically insignificant intercept). However, there are differences in factor loadings. Single-segment domestic firms load positively on SMB and negatively on HML factors. This relation is in the predicted direction because single-segment firms are small, low book-to-market firms (Table 3, Panel A). However, the result holds only for the 1990s. In the 1980s, there are no significant loadings on size and value factors. Moreover, while multi-segment domestic firms load negatively on SMB and positively on HML, the relation is weak and does not hold for sub-periods. Thus, in the domestic firms' sample, there is no indication that industrial diversification has significant impact on stock returns.

When we account for industrial diversification in the sample of geographically diversified firms, the trend is different in the 1980s in comparison to the 1990s. In the 1980s, multi-segment/geographically diversified firms earn monthly abnormal returns of 22 [22] basis points. Single-segment firms did not earn more than required returns. However, in the 1990s, we observe the opposite trend. Single-segment firms outperform passive strategy by 54 [45] basis points per month. This result suggests that, while geographic diversification plays a significant role in the stock return generating process, its impact has changed over time. One of the reasons may be that value of specialization in geographic diversification (Morck and Yeung (1991,1998); Doukas and Pantzalis (1999)) increased over time. It is also confirmed by changes in diversification trend. In the 1980s, the number of single-segment geographically diversified firms is about the same as the number of multi-segment geographically diversified firms. In the 1990s, the number of single-segment firms that diversify geographically almost doubled, while the number of multi-segment geographically diversified firms declined.

Next, we investigate the effect of geographic diversification on stock returns within single-segment and multi-segment categories for two sub-periods. The impact of geographic diversification on single-segment and multi-segment firms has changed over time. In the 1980s, there is no difference in abnormal return within single-segment category. Multi-segment geographically diversified firms earned significantly positive abnormal returns, while single-segment domestic firms did not. The difference is 29 basis points and is statistically significant at 5% level. Therefore, in that period, industrial diversification coupled with geographic diversification was beneficial. However, in the 1990s, the beneficial impact of geographic diversification on the multi-

segment firms disappears. At the same time, single-segment geographically diversified firms earned 59 basis points higher abnormal in comparison to single-segment domestic firms.

< Insert Table 7 about here >

Thus, results indicate that geographic diversification has strong and independent influence on stock returns, consistent with Bodnar, Tang and Weintrop (1999). However, change of the impact of geographic diversification over time depends on industrial diversification. This result suggests that when examining the impact of corporate diversification strategy one should account for industrial and geographic diversification independently and jointly.

Table 8 reports the result of F(GRS) tests for each diversification category. The abnormal performance of multi-segment/geographically diversified firms in the 1980s is driven primarily by large, low book-to-market firms. At the same time, low book-to-market multi-segment/domestic firms actually earn negative abnormal returns in that period along with almost all other categories. In the 1990s, F(GRS) is not significant for multi-segment firms, whether domestic or geographically diversified. However, in the 1990s, almost all categories of single-segment/geographically diversified firms (with only one exception) earn positive and significant abnormal returns, with F(GRS) statistic being highly statistically significant.

< Insert Table 8 about here >

This result indicates that geographic diversification has a significant effect on stock returns. Moreover, its impact changes over time depending on firms' industrial diversification. Additionally, finding significant abnormal risk-adjusted returns for different diversification categories (indicated by statistically significant intercept and confirmed by significant F(GRS) test) warrants further investigation of the impact of industrial and geographic diversification on stock return generating process.

3.5.Characteristic-Based Model

3.5.A. Methodology and Hypotheses

The results of the previous section indicate that geographic diversification is a significant determinant of stock returns, while the impact of industrial diversification is not certain. Therefore, we turn to the characteristic-based model (Daniel and Titman (1997), Brennan, Chordia and Subrahmanyam (1998)). The advantage of this model is that firm-specific characteristics are not lost within portfolios. If the return-generating process is based on firms' characteristics rather than on common risk factors, this model should help to investigate whether corporate diversification is a relevant characteristic.

For each month in the sample period, from July 1981 to June 2001, the following regression is estimated:

$$R_i = a_i + b_i X_i + c_i D_i + \epsilon_i , \qquad (3)$$

where, R_i are the monthly raw returns of each stock.

X_i is the vector of firms' characteristics that includes the following variables:

BM –log of book-to-market ratio in the previous fiscal year

SIZE – log of market capitalization at the end of month t (-2)

PRICE – log of price reciprocal at the end of month t (-2)

DVOL – the dollar volume of trading in the month t (-2). It is approximated by stock price at the end of month t (-2) multiplied by share volume in month t(-2).

DIVYLD – the ratio of dividends in the previous fiscal year to market capitalization at the calendar year end (not in logs).

RET6 – Compounded gross returns for months t (-6) through t (-2)

RET12 – Compounded gross returns for months t (-12) and t (-2)

CAPX/SALES – is the ratio of capital expenditures to sales in the previous fiscal year

EBIT/SALES - is the ratio of earnings before interest and taxes to sales in the previous fiscal year

DAT – the debt ratio in the previous fiscal year

D_i is the vector of variables that captures industrial and geographic diversification:

INDDUM – industrial diversification dummy.

GEODUM – geographic diversification dummy.

Lagged variables exclude the immediate prior month data to avoid any spurious association between prior month and the current month (Brennan, Chordia and Subrahmanyam (1998)), Gompers, Ishii and Metrick (2001)).

We follow the Fama and MacBeth (1973) procedure and estimate (3) separately for each month. Next, we calculate the time series mean of the coefficient estimates for the entire period from July 1981 to June 2001 (240 months), and for two sub-periods corresponding to the 1980s and 1990s (120 months respectively). Finally, we perform a t-test for the hull hypothesis that the mean is zero.

If corporate diversification has an impact on the stock returns the coefficients of diversification variables should be statistically significant. Moreover, if industrial diversification destroys value variable INDDUM should have negative coefficient. If, as indicated by our previous results, geographic diversification has a positive impact on the stock returns, the coefficient of variable GEODUM should be positive. The interactive term GEODUM*INDDUM should account for possible joint effect of industrial and geographic diversification.

To investigate the difference in the impact of geographic diversification on single-segment and multi-segment firms, we perform Fama-MacBeth regressions separately for single-segment and multi-segment firms and then find the coefficient difference. If geographic diversification affects single- segment and multi-segment firms differently, we should observe statistically significant coefficient for the variable GOEDUM. Moreover, this coefficient should be positive if geographic diversification benefits single-segment firms but not multi-segment firms, and negative otherwise.

3.5.B. Results

Regression results are reported in Table 9. Fama-MacBeth procedure confirms our results of positive effect of geographic diversification on stock returns. Panel A shows results for the entire period (240 months). Regression 1 includes only industrial and diversification dummy variables but does not account for interaction between them. Coefficient of geographic dummy variable is positive and statistically significant at 5% level. When accounted for interaction between industrial and geographic diversification (Regression2), coefficient of geographic dummy variable is no longer significant,

however still positive. Regressions 2 and 3 show results for single-segment and multi-segment firms separately. Geographic diversification dummy is positive for both single-segment and multi-segment firms. However, it is marginally statistically significant (10% level) only for multi-segment firms. The difference between geographic dummy coefficients is not statistically significant.

Previously, we have documented that the impact of corporate diversification is different for 1980s and 1990s. Therefore, Panels B and C report regression results for these periods respectively. In the 1980s, geographic diversification variable coefficient is not significant, whether with or without interactive variable included (Regressions 2 and 1 respectively). However, consistent with previous research literature (e.g., Comment and Jarrell (1995)), industrial diversification has statistically significant negative effect on stock returns. Moreover, the size of the industrial dummy variable coefficient and its statistical significance increases in the presence of interactive term. This implies that while industrial diversification has negative effect, it can be mitigated by geographic diversification (Regression 2).

When single-segment and multi-segment firms are considered separately, geographic diversification variable coefficients have opposite signs. In the sub-sample of singe-segment firms, geographic diversification coefficient is negative (Regression 3), while in the sub-sample of multi-segment firms it is positive (Regression 4). Neither is statistically significant. However, the difference between coefficients is statistically significant at 10% level (Regression 5). This finding suggests that, in the 1980s, geographic diversification had different impact on single-segment and multi-segment firms, confirming our previous results of four-factor model analysis.

Positive impact of geographic diversification becomes more pronounced in the 1990s (Panel C). Geographic diversification has significantly positive effect, but not industrial diversification. The coefficient of geographic diversification variable is positive and statistically significant without and with the interactive term (Regressions 1 and 2). In regressions separate for single-segment and multi-segment firms (Regressions 3 and 4), only single-segment firms experience statistically significant positive effect of geographic diversification. In multi-segment firms subsumable, geographic diversification variable coefficient is not significant though positive. However, the difference between coefficients is not statistically significant (Regression 5).

< Insert Table 9 about here >

Overall, our results suggest that geographic diversification is a profitable corporate business strategy and its importance has increased over time. However, the role of industrial diversification in stock return generating process remains elusive.

3.6.Constant-Composition Sample

Our overall sample contains considerable number of firms that are new to the market. Therefore, in order to mitigate the impact of new firms on the results we limit the sample to the firms that were present in the sample in 1981. To avoid look-ahead bias, we do not eliminate firms that did not survive until the end of study period. In other words, firms are allowed to exit the sample but not to enter.

The results of Fama and MacBeth regressions are reported in Table 10. In the 1980s (Panel B), we observe a definite negative impact of the industrial diversification as indicated by the highly statistically significant negative coefficient of the variable IND (Regressions 1 and 2). However, the combined effect of both industrial and geographic diversification is positive (Regression 2). Moreover, while we find that coefficients of GEODUM for single-segment and multi-segment firms separately are not statistically significant (Regressions 3 and 4) the return difference is significant (Regression 5). The difference is 27 basis points and is significant at 10% level. This result confirms our previous conclusion that, in the 1980s, industrial diversification combined with geographic diversification was beneficial to the shareholders.

In the 1990s (Panel C), both single-segment and multi-segment firms earn higher returns due to geographic diversification (Regressions 1 and 2). At the same, time the industrial diversification ceased being an important determinant of the stock returns. The combined impact of the industrial and geographic diversification becomes negative. However, it is not statistically significant. Moreover, the coefficients of GEO for single-segment and multi-segment firms separately are both positive and not statistically significant (Regressions 3 and 4); the return difference is not significant

either (Regression 5). Thus, this result indicates that new firms in our sample determine our previous finding of superior performance of single-segment geographically diversified firms. Moreover, since the number of firms in the sample declined over time it is possible, that multi-segment firms for which geographic diversification was negative had exited the market.

< Insert Table 10 about here >

3.7.Results Summary

A number of recent studies documents that some firm-specific characteristics rather than common risk factors systematically affect expected stock returns (Daniel and Titman (1997), Brennan, Chordia and Subrahmanyam (1998), Gompers, Ishii and Metrick (2001)). These findings suggest that firm characteristic such as degree of industrial and/or geographic diversification may have explanatory power in addition to risk factors commonly used in the finance literature. In this study, we applied several different approaches in order to examine stock returns of diversified versus specialized firms in an attempt to isolate effect of diversification on stock returns from the effect of other common firms' characteristics and risk.

The investigation of the comprehensive sample of publicly traded firms over the last 20 years yields several interesting results. First, after decline in the diversification, since 1980s and through the mid-1990s, there is an increase in both industrial and geographic diversification in at the end of 1990s. This trend reversal is not consistent with efficient markets and negative effect of corporate diversification.

Second, there are considerable differences in firm's characteristics depending on the industrial or geographic diversification. These characteristics include those affecting stock returns, e.g. size and book-to-market ratio (Fama and French (1992, 1993)) and capital expenditures (Titman, Wei, and Xie (2001)). It implies that diversified firms are not just a collection of single-segment units. They are fundamentally different and are not directly comparable to the portfolio of matching single-segment firms. Therefore, previous findings of diversification discount that employ imputed value technique (Berger and Ofek (1995)) may be driven by risk differences between diversified and specialized firms.

Third, returns of portfolios of diversified and focused firms do not differ. This result is surprising if corporate diversification is value destroying. However, finding of significantly different loadings on the risk factors confirms that single-segment and diversified firms are fundamentally different and no meaningful comparison can be made unless one accounts for these differences. Single-segment firms are smaller and their stock returns load positively on the size factor (SMB). At the same time, they have lower book-to-market ratio leading to positive loading on the value factor (HML). Diversified firms' stock returns have the opposite trend. They are large have higher book-to-market ratios. Therefore, negative loading on SMB offsets their positive loading on HML.

Fourth, the abnormal returns on the zero-investment portfolio, which takes a long position in the specialized firms and short position in diversified firms, are not significantly different from zero except for geographically diversified firms. Our results suggest that, in 1990s, industrially focused firms with operations abroad were rewarded

more than purely domestic firms. This result is robust to the model specification and does not change whether the four-factor model or the characteristic-based model is used. This result runs contrary to the finding of Dennis, Dennis, and Yost (2002) that geographic diversification destroys value. However, it confirms previous findings that multinationality is a valuable asset (Doukas and Travlos (1988), Doukas (1995), Morck and Yeung (1991,1998), Doukas and Pantzalis (1999), Bodnar et al (1999)).

Fifth, the effect of industrial diversification on stock returns remains inconclusive. While four-factor model does not show any significant effect of industrial diversification on stock returns, this result is not robust. In the characteristic based model framework, industrial diversification has a significant negative influence stock returns in the 1980s. Moreover, the effect of geographic diversification in the 1990s seems to depend on industrial diversification. The joint effect of industrial and geographic diversification is negative.

These findings warrant further investigation of the impact of industrial diversification. Therefore, Section 4 takes a closer look at the consequences of industrial diversification decision. Specifically, we examine stock returns of firms that diversify their operations through acquiring another firm from unrelated lines of business.

4. CORPORATE DIVERSIFICATION THROUGH MERGERS

4.1. Introduction

Do managers of the firm act in the best shareholders' interests when they implement corporate diversification strategy? Recent research has attempted to capture the effect of corporate diversification on firm's value (Lang and Stulz (1994), Comment and Jarrell (1995), Berger and Ofek (1995, 1996), Servaes (1996), Hubbard and Palia (1999), Matsusaka (1993, 2001), Chevalier (2000), Villalonga (2000), Whited (2001), Hyland and Diltz (2001, 2002), Campa and Kedia (2002), Mansi and Reeb (2002), Maksimovic and Phillips (2002), Schoar (2002), Graham, Lemmon, and Wolf (2002)). However, the results of these studies are inconclusive. There is no consensus not only about the reasons why corporate diversification destroys value, but also about the very existence of diversification discount.

Review of corporate diversification literature reveals several controversies. The first one is 'What gets discounted?' Several studies document that the use of the total firm value may produce biased results due to the measurement error in calculations of the market value of debt. For example, Mansi and Reeb (2002) argue that corporate diversification is neutral with respect to the total firm value. It merely transfers wealth from shareholders to the bondholders due to reduction of the firm's risk, and diversification discount is the result of measurement error in value of debt calculations. Similarly, Whited (2001) documents that calculations of Tobin's q contain measurement error. Given these findings, it may be difficult to obtain unbiased valuation measure. Moreover, corporate diversification may have different valuation

consequences for shareholders and debtholders. Perhaps, accurate and unambiguous investigation of partial effects of corporate diversification can be more informative than concentration on more ambitious, but less accurate, goal of total value effect. Therefore, this study focuses only on the shareholder value effect of corporate diversification and uses stock returns as a performance measure.

Secondly, there is a causality issue. Finding the association of corporate diversification with firms' performance does not constitute causality. For example, Lang and Stulz (1994), Campa and Kedia (1999), and Hyland and Diltz (2001) document that diversifying firms were traded at a discount even before diversification event. Additionally, Graham, Lemmon, and Wolf (2002) provide evidence that poor performance of firms that later become parts of conglomerates is responsible for sub-optimal performance of diversified firms. Therefore, the consequences of corporate diversification can be better captured around the time of diversifying event.

The definition of diversifying event requires some clarification. Corporate diversification can be achieved either through acquisition, internal growth, or restructuring. Graham, Lemmon, and Wolf (2002) distinguish between economic event of diversification of acquisition of new unit from unrelated industry and accounting event of increasing the number of reported business segments. Financial Accounting and Standards Bard (FASB) Statement 14 requires firms to report segments only if they provide at least 10 percent of firm's total revenues, assets, or profits. Due to this reporting requirement, it is difficult to identify the exact timing of diversification event for firms that increase number of segments through internal growth. Moreover, the process of gradual internal growth may be systematically different and have different

valuation effects than that of integrating operations of two previously independent firms. In order to control for these differences, this study focuses only on economic diversification event in Mergers and Acquisitions (M&A) context.

Another advantage of M&A framework is that it helps to resolve the third controversial issue - a problem with constructing a valid benchmark. Most of the previous research assumes that a portfolio of stand-alone single-segment firms is a valid benchmark for diversified firm valuation (e.g., Lang and Sulz (1994), Berger and Ofek (1995), Lanomt and Polk (2001)). Several studies question the existence of diversification discount by addressing the benchmark issues (e.g., Schoar (2000), Villalonga (2000), Lamont and Polk (2001), Graham, Lemmon, and Wolf (2002)). They conclude that any inferences about the effect of corporate diversification require very careful construction of the performance benchmark.

Present study uses pre-merger performance of firms as a benchmark in order to assess the impact of the acquisition on the firms' stock returns. The advantage of this approach is that it allows avoiding constructing proxy benchmark that consists of "typical" stand alone specialized firms. Instead, post-merger performance of the combined firm is compared to pre-merger performance of previously independent firms. After the merger, combined firm can be thought of as a portfolio of two previously independent firms. Therefore, the portfolio of target and acquiring firms before the merger is more accurate benchmark than portfolio of "typical" firms. Moreover, this approach allows controlling for any impact of pre-merger performance of both firms.

Our results suggest that acquisitions of independent firms outside of existing lines of business have a negative effect on shareholder value. Annual average buy-and-

hold abnormal return for firms acquiring targets in unrelated lines of business is about 15% more negative than that of firms acquiring targets in related lines of business. This difference cannot be explained by pre-merger performance of target firms. This result is not consistent with that of Graham, Lemmon, and Wolf (2002). Moreover, targets' characteristic differences, merger transaction size, method of payment, or acquisition premia cannot explain this difference. Furthermore, examination of cumulative monthly abnormal returns reveals that although acquiring firms in both related and unrelated mergers experience post-merger returns decline, the performance of unrelated firms deteriorates much faster in related than in related ones.

This study result is limited only to acquisitions of stand-alone firms. Corporate diversification through acquisition of divisions or units requires separate analysis in the absence of market valuation of these units. Moreover, corporate diversification through internal growth is even more challenging because the exact time of diversification event is not known. Thus, results of this study cannot be generalized to the universe of all firms that diversify their operations. However, it has implications for shareholders of firms that diversify through mergers and acquisitions of stand alone firms. Post-merger performance of firms that acquire targets in unrelated business is worse than that of firms acquiring targets in related lines of business. However, this performance decline is weakly associated with diversification per se. While statistically significant, diversification explains only 1% of the change in post-merger return changes.

4.2. Data

The sample consists of U.S. firms, for which completed merger transactions are recorded in *Mergers & Acquisitions* (M&A) Roster, Acquisitions in the U.S., during 1990-1999. We select transaction in which both the target and the bidder firms are independent publicly traded U.S. firms listed on NYSE, AMEX, or NASDAQ exchanges. In addition, the bidder firm should acquire 100% of the target firm's shares. Acquisitions of divisions and units, partial acquisitions (less than 100%), increase in interest in the firm, acquisition of remaining interest and acquisitions of bankrupt firms are excluded.

For each merger, we determine announcement and completion dates. The announcement date is when the news about acquisition first appears in the press and is reported in Dow Jones News database (Factiva). The news should contain the announcement of a definite agreement, a letter of intent, or a tender offer. The dates of completion are reported in M&A Roster and are subsequently verified by checking the news in Factiva database.

We obtain stock returns for both target and bidder firms from Center for Research in Security Prices database (CRSP). We require that both target and bidder firms have non-missing stock returns for 15 months before the merger announcement. In addition, the bidder firms must have non-missing returns for the 12 months after the completion date. We exclude the announcement month to avoid the effect on price fluctuations around the announcement. In addition, we exclude 3 months before the announcement month to exclude pre-announcement price run up. To avoid the overlap in the observation periods, we exclude multiple acquisitions by the same firm within

three-year interval of the announcement and completion dates. This step ensures that both pre-announcement returns and post-completion stock returns are not affected by price fluctuations around merger announcement.

Each merger is classified as related or unrelated. The classification is based on bidders' and targets' lines of business reported in the fiscal year before the merger announcement date. The line of business is defined by SIC code of reported segments and its description in COMPUSTAT active and research files.

This approach is similar to that of Graham, Lemmon, and Wolf (2002). However, we use more conservative classification. A merger is related if a bidder has prior experience operating in *all* target's line(s) of business. That is a target does not report any segments outside of bidder's expertise. It is different from Graham, Lemmon, and Wolf (2002) requirement that the acquirer and the target share *any* four-digit SIC codes. A merger is unrelated if a bidder acquires a firm from completely unrelated lines of business, that is a target and a bidder have no shared lines of business in the fiscal year before the merger announcement.

For example, when, in 1998, AIMS Department Stores Inc. (SIC 5331) acquired HILLS Stores Co. (SIC code 5331), it was clearly related acquisition. Alternatively, in 1996, MALLINCKRODT INC. reported operations in three segments (4-digit SIC codes 2819, 2834, 2835), all of them in Chemicals and Allied Products (2-digit SIC code 28). In 1997, it acquired NELLCOR PURITAN BENNETT INC. operating in Electromedical and Electrotherapeutic Apparatus industry (4-digit SIC code 3845). This transaction is classified as unrelated.

After careful matching by SIC codes and description of business segments, some mergers could not be classified unambiguously. In these mergers, the bidder and the target firms share some of reported SIC codes, but the overlap is neither 100% nor 0%. These mergers are excluded from our analysis.

The distribution of mergers by year and the type of transaction is reported in Table 11. The total sample consists of 202 related and 46 unrelated mergers. Several previous studies report the declining trend in the corporate diversification (Comment and Jarrell (1995), Berger and Ofek (1996), Dennis, Dennis, and Yost (2002)). Since our sample focuses on the 1990s, it is not surprising that the proportion of unrelated mergers in our sample is smaller than that in Graham, Lemon, and Wolf (2002) sample, which contains 226 related and 130 unrelated mergers during 1980 – 1995 period.

< Insert Table 11 about here >

4.3.Abnormal Returns

4.3. A. Methodology and Hypotheses

In order to investigate an impact of diversified merger on the bidder's stock performance, we compare returns of the portfolio of target and bidder firms before the merger and returns of the combined firm after the merger. First, we examine buy-and-hold abnormal returns for 12 months before merger announcement versus and for 12 months after the completion date. Second, we calculate cumulative monthly abnormal returns to examine sock performance over time. We perform this analysis for related and unrelated mergers separately.

To calculate the abnormal buy-and-hold return we use the following procedure. First, we obtain the monthly stock returns of the bidder and the target firms for the months (-15, -4) relative to announcement date and monthly stock returns or the months (+1, +12) relative to completion date from Chicago Research in Securities Prices (CRSP) database. Next, we calculate compound returns over the 12-months corresponding to the pre-announcement year (months –15, -4) and to the post-merger year (months +1, +12) for each firm and the corresponding value-weighted index that includes all stocks in the CRSP database. The abnormal buy-and-hold return is the difference between buy-and-hold return on the stocks and the buy-and-hold return on the index. Finally, we average abnormal buy-and-hold returns across firms.

Cumulative monthly abnormal return is the difference between monthly cumulative returns of each firm and monthly cumulative returns on the corresponding value-weighted CRSP index during the months (-15, -4) relative to the announcement

date and during months (+1, +12) relative to the completion date. Cumulative monthly abnormal stock returns are then averaged across firms.

In addition, we construct value-weighted portfolios of target and bidder firms for months (-15, -4). Then we calculate value-weighted buy-and-hold abnormal returns and cumulative monthly abnormal returns for each of these portfolios.

This procedure allows comparison of stock returns before the merger to that after the merger. Since a merger results in the combined firm that integrates two previously independent firms (the target and the bidder) the relevant benchmark for the post-merger performance should be the performance of portfolio of these firms before the merger. Moreover, accounting for the performance of the target and bidder before the merger captures the effect of targets' and bidders' pre-merger performances on the subsequent performance of the combined firm.

If diversification destroys value, we expect post-merger performance of firms acquiring targets in unrelated lines of business be significantly worse than that in related mergers. Moreover, the difference between pre-merger performance of the target and bidder combined portfolio and post-merger performance of the combined firm should be significantly larger for unrelated than for related mergers.

4.3.B. Results

Table 12, Panel A, reports average (mean and median) buy-and-hold abnormal stock returns of targets, bidders, and value-weighted portfolios of target and bidder before the merger. Panel B shows average (mean and median) buy-and-hold abnormal stock returns of combined firms after the merger. The last column shows results of mean and median equality tests. It reports t-statistics for test of mean equality hypothesis and Kruskal-Wallis statistics for median equality hypothesis.

Pre-merger average targets' buy-and-hold abnormal returns are significantly negative, consistent with previous findings of Graham, Lemmon, and Wolf (2002). However, they are almost the same for both related and unrelated acquisitions. The difference is only 0.07% [6.33%] and not statistically significant. Moreover, bidders that subsequently engage in unrelated acquisitions perform similarly to those in related mergers in the year before merger announcement. The difference is only 5.60% [1.65%] and not statistically significant. The same is observed for portfolios of target and bidder firms. Thus, there is not difference in pre-merger stock performance of targets and bidders between groups of related and unrelated mergers.

< Insert Table 12 about here >

However, when we compare post-merger performance of the focused mergers to that of diversified mergers we find that firms engaged in unrelated acquisitions perform worse than those in related mergers. Both focused and diversified acquisitions lead to the negative abnormal returns in the next 12 months after the completion of the merger.

However, average post-merger returns of diversified acquisitions are -25.81% [-23.09] while post-merger returns of focused acquisitions are only -11.32% [-16.93]. The difference is 14.49% [6.16%] and is statistically significant.

Figure 1 shows cumulative monthly abnormal returns of targets in focused and diversified acquisitions. Both targets of focused and diversified mergers experience stock return decline before they are acquired. Moreover, consistent with our previous analysis of buy-and-hold abnormal returns, we do not observe any significant differences in targets' stock performance in the pre-merger period.

< Insert Figure 1 about here >

Figure 2 shows cumulative abnormal returns of bidders in focused and diversified acquisitions. Consistent with the previous merger literature, bidders are performing exceptionally well before merger decision. However, firms that subsequently acquire targets outside of their specialization perform better than firms that engage in related mergers.

< Insert Figure 2 about here >

When we examine pre-merger performance of portfolios of target and bidder, the difference in the stock performance is more pronounced. Portfolios of targets and bidders in diversified mergers consistently outperform those in focused mergers. Therefore, the impact of targets' poor pre-merger performance is more pronounced in

focused mergers. This result is consistent with the fact that, in focused acquisitions, targets are larger relative to the bidder and therefore have greater impact on the overall portfolio returns.

< Insert Figure 3 about here >

In related mergers, bidders acquire targets that perform worse than that in unrelated mergers. After the merger, however, performance of bidders that acquired targets in unrelated lines of business begins to deteriorate rapidly (see Figure 4). After only three months relative to merger completion, returns of combined firms from unrelated businesses begin to fall at a much greater rate than that of related mergers. Since the first 12 months after the merger is the period when operations of a bidder and a newly acquired firm are merged, it suggests that unrelated mergers have difficulties integrating operations in comparison to the focused acquisitions.

< Insert Figure 4 about here >

4.4. Controlling for Firm-Specific Characteristics and Merger Differences

4.4.A. Methodology and Hypothesis

Further, we investigate the possibility that characteristics of bidders and/or targets prior the merger affect the subsequent performance of combined firms. To examine this hypothesis, we obtain firms' characteristics for fiscal years before and after the merger from COMPUSTAT active and research files. The list of firms' characteristics is based on the previous research of possible explanations of stock returns (Daniel and Titman (1997), Brennan et al (1998), Titman et al (2001)) Additionally, we examine whether merger characteristics, such as size of the transaction, acquisition premia, and method of payment, can explain differences in subsequent performance.

Finally, post-merger returns are regressed on prior targets' and bidders' returns, set of firms' characteristics, merger characteristics, and diversification dummy. We estimate the following regression:

$$R_i = a_i + b_i X_i + c_i D_i + \epsilon_i \qquad (4)$$

where, R_i is the post-merger buy-and-hold abnormal returns minus pre-merger buy-and-hold abnormal returns on value-weighted portfolio of target and bidder.

DDUM is the dummy variable that equals to 1 if merger is unrelated and 0 otherwise.

X_i is the vector of firms' and mergers' characteristics that includes the following variables:

TRET (-1) – targets' pre-merger annual abnormal buy-and-hold returns

BRET (-1) - bidders' pre-merger annual abnormal buy-and-hold returns

PREMIA – 4-week acquisition premia paid by acquirers

PAY – method of payment dummy, that takes a value of 1 if target was acquired for cash and zero otherwise

SIZE – the size of merger transaction (in millions of dollars)

TDIVYLD (-1) – targets' dividend yield in the fiscal year before the merger

BDIVYLD (-1) – bidders' dividend yield in the fiscal year before the merger

BDIVYLD – bidders' dividend yield in the fiscal year after the merger

TCAPX/SALES (-1) – targets' ratio of capital expenditures to sales in the fiscal year before the merger

BCAPX/SALES (-1) – bidders' ratio of capital expenditures to sales in the fiscal year before the merger

BCAPX/SALES – bidders' ratio of capital expenditures to sales in the fiscal year after the merger

TEBIT/SALES (-1) – targets' ratio of earnings before interest and taxes to sales in the fiscal year before the merger

BEBIT/SALES (-1) – bidders' ratio of earnings before interest and taxes to sales in the fiscal year before the merger

BEBIT/SALES – bidders' ratio of earnings before interest and taxes to sales in the fiscal year after the merger

TDAT (-1) – targets' debt ratio in the fiscal year before the merger

BDAT (-1) – bidders' debt ratio in the fiscal year before the merger

BDAT – bidders' debt ratio in the fiscal year after the merger

TSALE (-1) – log of targets' sales in the fiscal year before the merger

BSALE (-1) – log of bidders' sales in the fiscal year before the merger

BSALE – log of bidders' sales in the fiscal year after the merger

If the act of diversification has an impact on the post-merger returns of the combined firm, the coefficient of the dummy variable should be significant even after controlling for pre-merger targets' and bidders' performance, targets' and bidders' firm-specific characteristics, and merger transaction differences.

4.4.B. Results

Table 13, (Panel A) reports characteristics of targets and bidders before and after the merger. Firms that engage in unrelated acquisitions are larger than those involved in related mergers, measured by both total assets and sales. However, the size of targets in both types of mergers is almost identical. Thus, relative size of targets in related acquisitions is larger than that in unrelated mergers. Larger target firms should be more difficult to incorporate into existing operations of the bidder and should have greater impact on the subsequent performance of the bidder. However, our analysis of stock returns is not consistent with this observation. Post-merger performance of firms in related mergers is better than that in unrelated mergers. Targets' relative size does not seem to have any effect on the post-merger returns.

Profitability, measured by EBIT/Sales ratio, does not differ between related and unrelated merger targets and bidders neither before nor after the merger. The same is true for capital expenditures, dividend yield, and level of debt. These findings indicate that targets' characteristics cannot explain differences in the post-merger stock returns.

Another possibility is that characteristics of the merger transaction can provide some explanation for post-merger return differences. It may be that the bidder knows less about the nature of unrelated business, while bidders in related mergers can appraise the target properly. We investigate this possibility by comparing the transaction size and 4-week premia (reported in M&A Roster). It turns out that in related mergers bidders actually pay more than in unrelated mergers, measured by both size of the transaction and 4-week premia (Table 13, Panel B).

In addition, we examine the method of payment used in acquisition. Myers and Majluf (1984) argue that method by which an investment is financed conveys an important information. When the firm uses stock to finance an investment, it means that management believes that the stock is overvalued. Alternatively, the difference in method of payment reflects the confidence of the acquirer in potential gains and his willingness to assume (or to share) the risks and potential gains of the acquisition. Stock payment indicates that the bidder views the acquisition as a risky project and wants to share the risk with target shareholders (Rappaport and Sirower (1999)). However, in our sample, the proportions of cash transaction are similar across related and unrelated mergers. The proportion of stock payments is higher for related transactions. Since we observe that pre-merger abnormal returns are higher for unrelated bidders our finding is not consistent with over-valuation hypothesis (Mayers and Majluf (1984)). Neither it is consistent with risk hypothesis, since larger proportion of related (supposedly safer) mergers used stocks (54%) in comparison to diversified mergers (41%).

< Insert Table13 about here >

Next, we address the question to what extent changes in the stock returns associated with merger can be explained by firms' characteristics before and after merger. Moreover, we control for transaction characteristic differences, such as transaction size, method of payment, and acquisition premia. Table 14 reports regression results. Regression results are reported only for variables that have a significant impact on the post merger return changes. Variables that are not statistically significant and do not add explanatory power to the regression are omitted.

The diversification dummy variable is statistically significant even after controlling for firm specific characteristics, prior returns, transaction size, premia, and method of payment. In addition to diversification dummy variable, only pre-merger returns and pre-merger and post-merger debt ratios have any significant impact on post-merger stock return changes.

Both targets' and bidders' pre-merger abnormal returns have a negative effect on the returns change. However, bidders' pre-merger returns have the most explanatory power. Bidders' pre-merger abnormal returns alone explain 41% of subsequent return changes, while targets' pre-merger abnormal returns add only 2%. Superior performance of bidders that subsequently engage in unrelated mergers and their poor post-merger performance is consistent with overconfidence hypothesis (Roll (1986), Berkovitch and Narayanan (1993)).

Debt variables together add 3% of explanatory power. The pre-merger level of debt of the target is negatively associated with changes in post-merger returns while bidders' pre-merger debt level is positively associated with post-merger return changes. During merger, bidders assume targets' debt in addition to their own existing debt. In

some cases, bidders have to borrow more to finance an acquisition. In our sample, we find negative relation of post-merger level of debt to return changes.

Negative impact of bidders' post-merger level of debt is not consistent with usually positive role that debt has on stock returns (e.g. Jensen (1986)). Firms in unrelated mergers increase their level of debt above the pre-merger level of either bidder or the target. It means that in addition to assuming targets' debt they had to borrow more. It is consistent with increasing debt capacity argument for diversification. However, it seems that firms, that acquire unrelated businesses, borrow more than optimal amount and transfer wealth from shareholders to the debtholders (Jensen and Meckling (1976)).

< Insert Table14 about here >

Diversification dummy explains only 1% of post-merger return changes. This result suggests that, while statistically and economically significant, the observed negative effect of corporate diversification on post-merger return changes is not the major factor that affects post-merger under-performance.

4.5. Results Summary

This section examines the impact of the unrelated mergers on subsequent stock returns. The context of mergers and accusations allows investigation of the diversification effect directly. Moreover, this approach does not require a construction of the artificial and approximate benchmark, such as average industry performance or propensity to diversify. Since both merged firms were independent publicly traded firms before the merger, their performance is known and can be compared to subsequent performance of the combined firm.

Our results suggest that acquisitions of independent firms outside of existing lines of business have a negative effect on shareholder value. Annual average buy-and-hold abnormal returns for firms acquiring targets in unrelated lines of business is about 15% more negative than that of firms acquiring targets in related lines of business. Pre-merger targets' performance or differences in firm-specific characteristics cannot explain this post-merger return difference. This result is not consistent with that of Graham, Lemmon, and Wolf (2002). Moreover, post-merger return changes cannot be explained by mergers' characteristics, such as transaction size, method of payment or acquisition premia. Furthermore, examination of cumulative monthly abnormal returns reveals that although acquiring firms in both related and unrelated mergers experience post-merger returns decline, the performance of unrelated firms deteriorates much faster in unrelated than in related acquisitions.

However, regression analysis indicates that corporate diversification is not the major factor explaining poor post-merger performance. While statistically significant, diversification explains only 1% of the change in post-merger return changes in

comparison to 41% explained by bidders' pre-merger returns. This result is more consistent with overconfidence hypothesis (Roll (1986)). Managers of firms that experience superior pre-merger performance are overconfident in their appraisal of future merger benefits. Our results are also consistent with studies that document long-term post-event under-performance and returns mean reversal (e.g., Agrawal, Jaffe, and Mandelker (1993), Lakonisok, Shleifer, and Vishny (1994)).

5. CONCLUSION

Prior literature (see Lang and Stulz (1994), Comment and Jarrell (1995), Berger and Ofek (1995, 1996), and Servaes (1996), among others) documents that majority of diversified firms sell at a discount in comparison to focused firms. This negative relation between corporate diversification and firm value suggests that stock returns of diversified firms should be affected as well. This study concentrates on the analysis of stock returns of diversified versus specialized firms.

The major underlying assumption in the prior literature is that value of divisions of diversified firms can be approximated by value of a portfolio of stand-alone specialized firms. However, recent research in this area suggests that divisions of diversified firms are fundamentally different from stand-alone firms in many characteristics (e.g., Villalonga (2000), Mansi and Reeb (2002)). Therefore, this study does not employ the imputed value methodology. Instead, we examine two complementing hypotheses. First, corporate diversification associates with systematic risk differences between diversified and specialized firms. Second, corporate diversification has value effect in addition to other systematic and firm-specific factors.

In this study, we have analyzed long-term stock performance of diversified firms in comparison to specialized firms. With respect to expected stock returns, low market valuation (low Tobin's q or high book-to-market ratio) of diversified firms implies risk differential, mispricing, or corporate diversification being a significant firm characteristic affecting value and stock returns. Therefore, we examine stock returns of diversified and specialized firms using both factor-pricing model (Fama and French

(1992,1993), Carhart (1997)) and characteristic-based model (Daniel and Titman (1997), Brennon, Chordia and Subrahmanyam (1998)).

In addition, the extant literature documents that there are two dimensions corporate diversification – industrial and geographic. Recent studies document that these types of corporate diversification have separate and joint affect on firm value (Bodnar, Tang and Weintrop (1999), Dennis, Dennis and Yost (2002)). Therefore this study explores both sides of corporate diversification.

The investigation of the comprehensive sample of publicly traded firms over the last 20 years yields several interesting results. First, after declining since 1980s and through the mid-1990s, there is an increase in both industrial and geographic diversification in at the end of 1990s. This diversification trend reversal is rather puzzling because it is not consistent with negative effect of corporate diversification and efficient markets.

Second, we found that, depending on the industrial or geographic diversification, firm's characteristics differ. These characteristics include those affecting stock returns, e.g. size and book-to-market ratio (Fama and French (1992, 1993)) and capital expenditures (Titman et al (2002)). It implies that diversified firms are not just a mechanical collection of single-segment units. When several business segments are combined, the resulting entity acquires fundamentally different characteristics and, therefore, is no longer comparable to the portfolio of single-segment firms. This result suggests that previous diversification discount findings that employ imputed value technique (Berger and Ofec (1995)) may be driven by characteristics differences among diversified and specialized firms.

Third, investigation of returns of portfolios of diversified and focused firms shows that they do not differ. This result is not consistent with corporate diversification being a value destroying activity. However, this result is driven by significantly different loadings on the risk factors. Single-segment firms are smaller and their stock returns load positively on the size factor (SMB). At the same time, they have lower book-to-market ratio leading to positive loading on the value factor (HML). Diversified firms' stock returns have the opposite trend. They are large and have higher book-to-market ratios. Therefore, negative loading on SMB offsets their positive loading on HML. This result is confirmed by examination of abnormal returns on the zero-investment portfolio, which takes a long position in the specialized firms and short position in diversified firms. Abnormal returns on the zero-investment portfolio are not significantly different from zero except for geographically diversified firms.

Fourth, our results suggest that, in 1990s, industrially focused firms with operations abroad were rewarded more than purely domestic firms were. This result is robust to the model specification and does not change whether the four-factor model or the characteristic-based model is used. This result runs contrary to the finding of Dennis, Dennis, and Yost (2002) that geographic diversification destroys value. However, it confirms previous findings that multinationality is a valuable asset (Doukas and Travlos (1988); Doukas (1995); Morck and Yeung (1991,1998); Doukas and Pantzalis (1999); Bodnar et al (1999)).

Fifth, our methodology did not allow for unambiguous results of the effect of industrial diversification on stock returns. While four-factor model does not show any significant effect of industrial diversification on stock returns, this result is not robust.

In the characteristic based model framework, industrial diversification has a significant negative influence stock returns in the 1980s. Moreover, the effect of geographic diversification in the 1990s seems to depend on industrial diversification with joint effect of industrial and geographic diversification being negative.

To answer the question of the impact of corporate industrial diversification of the stock returns, Section 4 presents a study that focuses on diversifying event. Specifically, we examine a smaller sample of firms that diversified their operations through mergers and acquisitions. We compare combined performance of the target and the bidder before the merger to the performance of the merged entity after the merger has been completed. In order to test the impact of the corporate diversification on the subsequent performance of the acquiring firm we compare unrelated (diversifying) mergers to the mergers in the same line of business.

The context of mergers and accusations allows investigation of the diversification effect directly. Moreover, this approach does not require a construction of the artificial and approximate benchmark, such as average industry performance or propensity to diversify. Since both merged firms were independent publicly traded firms before the merger, their performance is known and can be compared to subsequent performance of the combined firm.

Results suggest that acquisitions of independent firms outside of existing lines of business have a negative effect on shareholder value. Annual average buy-and-hold abnormal returns for firms acquiring targets in unrelated lines of business is about 15% more negative than that of firms acquiring targets in related lines of business. Pre-merger targets' performance or differences in firm-specific characteristics cannot

explain this post-merger return difference. This result is not consistent with that of Graham, Lemmon, and Wolf (2002). Moreover, post-merger return changes cannot be explained by mergers' characteristics, such as transaction size, method of payment or acquisition premia. Furthermore, examination of cumulative monthly abnormal returns reveals that although acquiring firms in both related and unrelated mergers experience post-merger returns decline, the performance of unrelated firms deteriorates much faster in unrelated than in related acquisitions.

However, regression analysis indicates that corporate diversification is not the major factor explaining poor post-merger performance. While statistically significant, diversification explains only 1% of the change in post-merger return changes in comparison to 41% explained by bidders' pre-merger returns. This result is more consistent with overconfidence hypothesis (Roll (1986)). Managers of firms that experience superior pre-merger performance are overconfident in their appraisal of future merger benefits. Our results are also consistent with studies that document long-term post-event under-performance and returns mean reversal (Agrawal, Jaffe, and Mandelker (1993), Lakonisok, Shleifer, and Vishny (1994)).

This study contributes to the corporate diversification literature in several ways. First, we investigate the value of the corporate diversification from the investor's perspective and use a methodology different from that of other studies. Instead of constructing artificial portfolios of single-segment firms that match diversified firms by size and industry, we employ a real-life investment strategy. We do not rely on the matching technique of Berger and Ofek (1995), because single-segment firms are fundamentally different from segments of diversified firm in many dimensions.

Second, we address the puzzling finding of geographic diversification discount by Dennis et al (2002). Applying different approach, we investigate the impact of geographic diversification on the shareholders' wealth and find support for value increasing effect of geographic diversification.

Third, this study addresses the issue of causality and examines the effect of the corporate diversification at the time of diversifying event (mergers and acquisitions). While result of this investigation is limited to acquisitions of stand-alone firms, it has important implications for assessment of managerial decision to diversify with respect to shareholders' value.

The overall results can be summarized as follows. Corporate diversification changes the nature of the firm. Not only the composition of the firm becomes different, the overall firm's risk characteristics change. Thus, corporate diversification has an impact on firm value through changes of the firm's characteristics. However, corporate diversification per se is an important firm characteristic that affects stock returns in addition to other firm-specific characteristics. At least with respect to geographic diversification, there is no doubt that the effect on the firm's value is beneficial. However, impact of industrial diversification seems to depend on many other conditions, such as other firm-specific characteristics (including geographic diversification) and characteristics of the segment being added to the firm during diversifying event.

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Table 1
Distribution of Firms in Single-Segment and Multi-Segment Portfolios by Portfolio Formation Year

At the end of June of each year (1981-2000) all NYSE/AMEX/NASDAQ firms are allocated into one of two portfolios according to the number of reported segments by SIC code: portfolio of single-segment firms or portfolio of multi-segment firms. The data on segments are collected from COMPUSTAT research and active files at the fiscal year ending year t-1 relative to the portfolio formation year t. Segment is defined by reported operations and sales in the same SIC code. If a firm reports operations and sales in several segments with the same SIC code, these segments are treated as one. Firms that report sales generated by only one segment are classified as single-segment firms. Firms with two or more segments are classified as multi-segment firms. Firms with segments in 1-digit SIC code of 0, 6 or 9 and firms with total sales less than $10 million are excluded.

Panel A: Firms Classified by 4-digit SIC Code

Portfolio Formation Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average
Single-Segment Firms	1024	1086	1401	1551	1664	1731	1851	1790	1956	1973	1993	2104	2320	2620	2885	3150	3477	3580	2763	2330	2162
Multi-Segment Firms	1117	1103	1235	1200	1133	1055	972	913	840	792	774	755	764	775	777	766	754	717	961	861	913
Total	2141	2189	2636	2751	2797	2786	2823	2703	2796	2765	2767	2859	3084	3395	3662	3916	4231	4297	3724	3191	3076
Percent of Multi-Segment Firms	52%	50%	47%	44%	41%	38%	34%	34%	30%	29%	28%	26%	25%	23%	21%	20%	18%	17%	26%	27%	30%
Average Number of Segments per Firm	2.11	2.05	1.95	1.86	1.77	1.70	1.62	1.61	1.51	1.48	1.47	1.44	1.40	1.36	1.34	1.31	1.28	1.26	1.39	1.40	1.52
Average Number of Segments per Multi-Segment Firm	3.13	3.09	3.02	2.97	2.90	2.84	2.79	2.80	2.69	2.69	2.69	2.66	2.63	2.58	2.59	2.58	2.56	2.55	2.51	2.48	2.77

Panel B: Firms Classified by 2-digit SIC Code

Portfolio Formation Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average
Single-Segment Firms	1203	1266	1596	1735	1830	1895	2007	1943	2094	2111	2128	2237	2464	2763	3027	3299	3627	3718	2984	2542	2323
Multi-Segment Firms	938	923	1040	1016	967	891	816	760	702	654	639	622	620	632	635	617	604	579	740	649	752
Total	2141	2189	2636	2751	2797	2786	2823	2703	2796	2765	2767	2859	3084	3395	3662	3916	4231	4297	3724	3191	3076
Percent of Multi-Segment Firms	44%	42%	39%	37%	35%	32%	29%	28%	25%	24%	23%	22%	20%	19%	17%	16%	14%	13%	20%	20%	24%
Average Number of Segments per Firm	1.79	1.75	1.68	1.61	1.56	1.51	1.45	1.44	1.36	1.34	1.34	1.31	1.28	1.26	1.24	1.22	1.19	1.18	1.26	1.26	1.37
Average Number of Segments per Multi-Segment Firm	2.81	2.78	2.72	2.66	2.61	2.59	2.55	2.56	2.45	2.45	2.46	2.42	2.40	2.37	2.38	2.38	2.37	2.34	2.29	2.26	2.52

Table 2
Distribution of Firms in Single-Segment and Multi-Segment Portfolios for Domestic and Geographically Diversified Firms by Portfolio Formation Year

At the end of June of each year (1981-2000) all NYSE/AMEX/NASDAQ firms are allocated into one of two portfolios according to the number of reported segments by SIC code: portfolio of single-segment firms or portfolio of multi-segment firms. The data on segments are collected from COMPUSTAT research and active files at the fiscal year ending year t-1 relative to the portfolio formation year t. Segment is defined by reported operations and sales in the same SIC code. If a firm reports operations and sales in several segments with the same SIC code, these segments are treated as one. Firms that report sales generated by only one segment are classified as single-segment firms. Firms with two or more segments are classified as multi-segment firms. Firms with segments in 1-digit SIC code of 0, 6 or 9 and firms with total sales less than $10 million are excluded. Independently firms are classified as geographically diversified if they report more than 10% of foreign sales.

Panel A1: Domestic Firms Classified by 4-digit SIC Code

Portfolio Formation Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average
Single-Segment Firms	807	866	1134	1267	1364	1406	1470	1407	1519	1529	1535	1591	1760	2026	2316	2445	2691	2737	2014	1621	1675
Multi-Segment Firms	753	754	890	870	823	770	688	629	589	555	539	506	524	543	545	525	504	462	586	479	627
Total Domestic Firms	1560	1620	2024	2137	2187	2176	2158	2036	2108	2084	2074	2097	2284	2569	2861	2970	3195	3199	2600	2100	2302
Multi-Segment Firms as a Percent of Domestic Firms	48%	47%	44%	41%	38%	35%	32%	31%	28%	27%	26%	24%	23%	21%	19%	18%	16%	14%	23%	23%	27%
Multi-Segment Domestic Firms as a Percent of Total Sample Firms	35%	34%	34%	32%	29%	28%	24%	23%	21%	20%	19%	18%	17%	16%	15%	13%	12%	11%	16%	15%	20%

Panel A2: Domestic Firms Classified by 2-digit SIC Code

Portfolio Formation Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average
Single-Segment Firms	931	990	1267	1393	1475	1523	1580	1511	1615	1628	1629	1686	1857	2127	2412	2540	2792	2828	2148	1729	1783
Multi-Segment Firms	629	630	757	744	712	653	578	525	493	456	445	411	427	442	449	430	403	371	452	371	519
Total Domestic Firms	1560	1620	2024	2137	2187	2176	2158	2036	2108	2084	2074	2097	2284	2569	2861	2970	3195	3199	2600	2100	2302
Multi-Segment Firms as a Percent of Domestic Firms	40%	39%	37%	35%	33%	30%	27%	26%	23%	22%	21%	20%	19%	17%	16%	14%	13%	12%	17%	18%	23%
Multi-Segment Domestic Firms as a Percent of Total Sample Firms	29%	29%	29%	27%	25%	23%	20%	19%	18%	16%	16%	14%	14%	13%	12%	11%	10%	9%	12%	12%	17%

Table 2 (Continued)

Panel B1: Geographically Diversified Firms Classified by 4-digit SIC Code

Portfolio Formation Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average
Single-Segment Firms	217	220	267	284	300	325	381	383	437	444	458	513	560	594	569	705	786	843	749	709	487
Multi-Segment Firms	364	349	345	330	310	285	284	284	251	237	235	249	240	232	232	241	250	255	375	382	287
Total Geographically Diversified Firms	581	569	612	614	610	610	665	667	688	681	693	762	800	826	801	946	1036	1098	1124	1091	774
Multi-Segment Firms as a Percent of Geographically Diversified Firms	63%	61%	56%	54%	51%	47%	43%	43%	36%	35%	34%	33%	30%	28%	29%	25%	24%	23%	33%	35%	37%
Multi-Segment Geographically Diversified Firms as a Percent of Total Sample Firms	17%	16%	13%	12%	11%	10%	10%	11%	9%	9%	8%	9%	8%	7%	6%	6%	6%	6%	10%	12%	9%

Panel B2: Geographically Diversified Firms Classified by 2-digit SIC Code

Portfolio Formation Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average
Single-Segment Firms	272	276	329	342	355	372	427	432	479	483	499	551	607	636	615	759	835	890	836	813	541
Multi-Segment Firms	309	293	283	272	255	238	238	235	209	198	194	211	193	190	186	187	201	208	288	278	233
Total Geographically Diversified Firms	581	569	612	614	610	610	665	667	688	681	693	762	800	826	801	946	1036	1098	1124	1091	774
Multi-Segment Firms as a Percent of Geographically Diversified Firms	53%	51%	46%	44%	42%	39%	36%	35%	30%	29%	28%	28%	24%	23%	23%	20%	19%	19%	26%	25%	30%
Multi-Segment Geographically Diversified Firms as a Percent of Total Sample Firms	14%	13%	11%	10%	9%	9%	8%	9%	7%	7%	7%	7%	6%	6%	5%	5%	5%	5%	8%	9%	8%

Table 3
Characteristics of Portfolios Sorted by Industrial and Geographic Diversification

Portfolios are formed at the end of June of each year (1981-2000) according to SIC code and the level of foreign sales (see Table 2). Size and book-to-market are calculated using Fama and French methodology.
Panels A and B show the average number of firms in the corresponding portfolio, size and book-to-market ratio, Debt-to-Total Assets ratio, Capital expenditures to total sales ratio, EBIT to total sales ratio, and dividend yield averaged across firms for each year and than averaged over the years in each time period.
Size is the market capitalization of the firm at the end of June of the portfolio formation year t collected from CRSP. Book-to-market ratio is calculated as follows: BE/ME, where BE is the COMPUSTAT book value of stockholders' equity, plus deferred taxes and investment tax credit (if available), minus the book value of preferred stock. The book value of preferred stock is estimated depending on the availability using redemption, liquidation, or par value (in that order). BE is calculated for the fiscal year ending in calendar year t-1. Firms with negative BE are excluded from the sample. ME is the market capitalization of the firm at the end of December of calendar year t-1.
Panel C shows the returns on the corresponding portfolios. We report average monthly raw returns, average monthly abnormal returns, buy and hold returns, and cumulative abnormal returns. Average monthly raw returns are returns on the value-weighted corresponding portfolio. Average monthly abnormal returns are the portfolio returns in the excess of the value-weighted market portfolio. The abnormal buy and hold returns are the monthly returns compounded over the one-year holding period less the buy and hold returns on the market. Cumulative abnormal returns are the sum of monthly returns over the one-year period less of the cumulative market returns. Market portfolio consists of all NYSE/AMEX/NASDAQ firms in CRSP.
We use three time periods: 1981 – 2000, 1981 –1990, and 1991 – 2000.

Panel A: Number of Firms, Size, and Book-to-Market Ratio

	Number of Firms			Size (Millions of $)			Book-to Market Ratio		
	Domestic Firms	Geographically Diversified Firms	All	Domestic Firms	Geographically Diversified Firms	All	Domestic Firms	Geographically Diversified Firms	All
1981 – 2000									
Single-segment	1675	487	2163	496.98	1417.03	713.90	0.87	0.74	0.84
	[1783]	[541]	[2324]	[519.30]	[1507.77]	[758.89]	[0.88]	[0.75]	[0.85]
Multi-segment	627	287	914	841.35	3079.67	1593.60	0.95	0.83	0.91
	[519]	[233]	[752]	[828.68]	[3243.16]	[1641.26]	[0.95]	[0.84]	[0.91]
All	2302	774		579.98	1988.88		0.90	0.78	
1981 - 1990									
Single-segment	1277	326	1603	293.88	829.50	401.83	0.92	0.81	0.90
	[1391]	[377]	[1768]	[307.31]	[900.42]	[433.36]	[0.94]	[0.83]	[0.91]
Multi-segment	732	304	1036	481.67	1819.75	875.00	1.03	0.94	1.00
	[618]	[253]	[871]	[481.37]	[1891.81]	[892.85]	[1.01]	[0.94]	[0.99]
All	2009	630		356.06	1274.55		0.96	0.88	
1991 -2000									
Single-segment	2074	649	2723	700.07	2004.56	1025.97	0.83	0.67	0.79
	[2175]	[704]	[2879]	[731.30]	[2115.13]	[1084.43]	[0.83]	[0.67]	[0.79]
Multi-segment	521	269	790	1201.03	4339.59	2312.20	0.87	0.72	0.82
	[420]	[214]	[634]	[1175.99]	[4594.52]	[2389.68]	[0.88]	[0.74]	[0.84]
All	2595	918		803.91	2703.21		0.83	0.68	

Table 3 (Continued)

Panel B: Debt, Capital Expenditures, Earnings, and Dividend Yield

	Debt as a Percent of Total Assets			CAPEX / SALES			EBIT / SALES			Dividend Yield		
	Domestic Firms	Geographically Diversified Firms	All	Domestic Firms	Geographically Diversified Firms	All	Domestic Firms	Geographically Diversified Firms	All	Domestic Firms	Geographically Diversified Firms	All
1981 – 2000												
Single-segment	24.29%	19.60%	23.26%	11.43%	8.41%	10.74%	5.89%	7.19%	6.24%	1.36%	1.17%	1.32%
	[24.57%]	[20.25%]	[23.59%]	[11.14%]	[8.19%]	[10.91%]	[5.41%]	[6.92%]	[6.48%]	[1.35%]	[1.27%]	[1.44%]
Multi-segment	27.72%	24.82%	26.83%	8.77%	8.64%	8.95%	6.90%	7.27%	7.11%	2.15%	2.54%	2.17%
	[27.57%]	[24.56%]	[26.63%]	[8.02%]	[7.83%]	[8.12%]	[6.21%]	[7.30%]	[6.61%]	[1.96%]	[2.64%]	[2.06%]
All	25.17%	21.49%		10.81%	8.37%		6.02%	7.20%		1.56%	1.64%	
1981 - 1990												
Single-segment	25.74%	20.65%	24.71%	11.68%	8.97%	11.13%	8.62%	8.67%	8.64%	1.96%	1.59%	1.88%
	[26.09%]	[21.33%]	[25.07%]	[11.10%]	[8.02%]	[11.37%]	[7.38%]	[8.01%]	[8.83%]	[1.89%]	[1.77%]	[2.06%]
Multi-segment	28.11%	24.54%	27.06%	8.30%	8.74%	8.94%	7.74%	7.85%	7.88%	2.69%	3.32%	2.69%
	[27.78%]	[24.33%]	[26.77%]	[7.29%]	[8.75%]	[8.14%]	[7.02%]	[7.88%]	[7.33%]	[2.41%]	[3.41%]	[2.50%]
All	26.60%	22.47%		10.80%	8.70%		8.29%	8.38%		2.19%	2.23%	
1991 -2000												
Single-segment	22.84%	18.55%	21.81%	11.18%	7.85%	10.35%	3.15%	5.71%	3.85%	0.75%	0.74%	0.75%
	[23.05%]	[19.17%]	[22.10%]	[11.19%]	[8.36%]	[10.45%]	[3.44%]	[5.82%]	[4.12%]	[0.82%]	[0.78%]	[0.81%]
Multi-segment	27.34%	25.10%	26.60%	9.25%	8.53%	8.96%	6.05%	6.69%	6.34%	1.61%	1.76%	1.65%
	[27.35%]	[24.80%]	[26.49%]	[8.75%]	[6.91%]	[8.10%]	[5.39%]	[6.72%]	[5.88%]	[1.50%]	[1.87%]	[1.61%]
All	23.75	20.51%		10.82%	8.04%		3.75%	6.02%		0.93%	1.04%	

Table 4
Portfolios' Returns

For each diversification category, this table reports average monthly raw returns, average monthly abnormal returns, buy and hold abnormal returns, and cumulative abnormal returns. Average monthly raw returns are returns on the value-weighted corresponding portfolio. Average monthly abnormal returns are the portfolio raw returns less the value-weighted market portfolio returns. The abnormal buy and hold returns are the monthly returns compounded over the one-year holding period less the buy and hold returns on the market. Cumulative abnormal returns are the sum of monthly returns over the one-year period less the cumulative market returns over the same period. Market portfolio consists of all NYSE/AMEX/NASDAQ firms in CRSP database.

	Average Monthly Raw Returns			Average Monthly Abnormal Returns			Buy-and-Hold Abnormal Returns			Cumulative Abnormal Returns		
	Domestic Firms	Geographically Diversified Firms	All	Domestic Firms	Geographically Diversified Firms	All	Domestic Firms	Geographically Diversified Firms	All	Domestic Firms	Geographically Diversified Firms	All
1981 – 2000												
Single-segment	1.17%	1.37%	1.27%	-0.04%	0.15%	0.05%	-0.62%	2.29%	0.70%	-0.52%	1.84%	0.63%
	[1.18%]	[1.35%]	[1.26%]	[-0.03%]	[0.13%]	[0.05%]	[-0.43%]	[2.00%]	[0.63%]	[-0.36%]	[1.59%]	[0.57%]
Multi-segment	1.11%	1.28%	1.21%	-0.10%	0.07%	0.00%	-1.35%	1.02%	0.01%	-1.24%	0.85%	-0.04%
	[1.11%]	[1.30%]	[1.22%]	[-0.10%]	[0.09%]	[0.01%]	[-1.35%]	[1.21%]	[0.10%]	[-1.19%]	[1.06%]	[0.07%]
All	1.14%	1.35%		-0.07%	0.14%		-0.95%	1.99%		-0.85%	1.63%	
1981 - 1990												
Single-segment	1.30%	1.17%	1.24%	0.09%	-0.04%	0.03%	1.01%	-0.69%	0.12%	1.07%	-0.49%	0.32%
	[1.32%]	[1.21%]	[1.26%]	[0.11%]	[0.00%]	[0.05%]	[1.34%]	[-0.09%]	[0.52%]	[1.36%]	[0.02%]	[0.65%]
Multi-segment	1.16%	1.44%	1.33%	-0.05%	0.23%	0.12%	-0.66%	2.96%	1.43%	-0.60%	2.76%	1.39%
	[1.10%]	[1.43%]	[1.30%]	[-0.11%]	[0.22%]	[0.09%]	[-1.40%]	[2.80%]	[1.11%]	[-1.31%]	[2.63%]	[1.10%]
All	1.23%	1.33%		0.02%	0.12%		0.22%	1.41%		0.29%	1.42%	
1991 -2000												
Single-segment	1.04%	1.56%	1.30%	-0.18%	0.35%	0.08%	-2.24%	5.28%	1.28%	-2.12%	4.17%	0.95%
	[1.04%]	[1.48%]	[1.26%]	[-0.17%]	[0.26%]	[0.04%]	[-2.21%]	[4.08%]	[0.75%]	[-2.08%]	[3.17%]	[0.48%]
Multi-segment	1.06%	1.13%	1.09%	-0.16%	-0.09%	-0.12%	-2.04%	-0.91%	-1.41%	-1.87%	-1.06%	-1.48%
	[1.13%]	[1.17%]	[1.14%]	[-0.09%]	[-0.04%]	[-0.08%]	[-1.31%]	[-0.38%]	[-0.91%]	[-1.07%]	[-0.51%]	[-0.96%]
All	1.05%	1.37%		-0.17%	0.15%		-2.11%	2.57%		-1.99%	1.83%	

Table 5
Four-Factor Time-Series Regressions for Monthly Excess Returns for Portfolios of Single-Segment and Multi-Segment Firms, and Zero-Investment Portfolios.

$$R_i^S - R_f = a_i + b_i(R_m - R_f) + s_i SMB + h_i HML + m_i MOMENTUM + \epsilon_i \quad (1);$$
$$R_i^M - R_f = a_i + b_i(R_m - R_f) + s_i SMB + h_i HML + m_i MOMENTUM + \epsilon_i \quad (2);$$
$$R_i^S - R_i^M = a_i + b_i(R_m - R_f) + s_i SMB + h_i HML + m_i MOMENTUM + \epsilon_i \quad (3)$$

$R_i^S - R_f$ are the monthly excess returns on value-weighted portfolio of single-segment firms. $R_i^M - R_f$ are the monthly excess returns on value-weighted portfolio of multi-segment firms. The formation of portfolios of single-and multi-segment firms is described in Table 1. Portfolios are formed on July 1st of each year in the 1981 –1999 period and are held for 12 months. If a firm stops trading during the year, its returns are replaced by the mean returns of the portfolio. Returns on portfolios are calculated using CRSP. $R_i^S - R_i^M$ are the monthly returns on the zero-investment portfolio formed by taking a long position in the portfolio of single-segment firms and short position in the portfolio of multi-segment firms. R_f is the monthly Treasury bill rate. $R_m - R_f$ are the value-weighted excess market returns on all NYSE/AMEX/NASDAQ firms. SMB (small minus big) is the difference each month between the returns on small firms and big firms. HML (high minus low) is the difference each month between return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. MOMENTUM is the a momentum factor, constructed from six value-weight portfolios formed using independent sorts on size and prior return of NYSE, AMEX, and NASDAQ stocks. It is the average of the returns on two (big and small) high prior return portfolios minus the average of the returns on two low prior return portfolios. Prior return is measured from month -12 to -2. All returns are in percent.
Factors are obtained from K. French web page.
Regressions are performed for the whole time period 07/1981-06/2000 and two sub-periods corresponding to 1980s and 1990s.
t-statistics are in parentheses. *, **, *** denote significance at 10%, 5% and 1% level.

Panel A: Firms Classified by 4-digit SIC Code

Regression	Portfolios of Single-Segment Firms (1)						Portfolios of Multi-Segment Firms (2)						Zero-Investment Portfolios (3)					
Time Period	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
07/1981 – 06/2001	0.21***	0.92***	0.05**	-0.30***	0.04**	0.94	0.09	0.96***	-0.15***	0.01	-0.08***	0.96	0.12	-0.04	0.21***	-0.31***	0.11***	0.44
(240 Months)	(2.58)	(44.84)	(2.08)	(-9.80)	(1.95)		(1.39)	(59.68)	(-7.41)	(0.33)	(-5.46)		(0.97)	(-1.28)	(5.13)	(-6.54)	(4.06)	
07/1981 – 06/1991	0.07	0.95***	-0.07*	-0.05	-0.01	0.97	0.10*	0.98***	-0.13***	-0.06**	0.05***	0.99	-0.03	-0.04	0.06	0.02	-0.06	0.02
(120 Months)	(0.40)	(47.40)	(-1.81)	(-1.14)	(0.67)		(1.87)	(78.44)	(-5.52)	(-2.53)	(2.76)		(-0.23)	(-1.31)	(1.17)	(0.32)	(-1.53)	
07/1991 – 06/2001	0.22**	0.96***	0.07**	-0.37***	0.04**	0.95	0.11	0.90***	-0.14***	0.01	-0.13***	0.93	0.11	0.06	0.21***	-0.39***	0.17***	0.68
(120 Months)	(1.98)	(29.92)	(2.32)	(-6.69)	(1.93)		(1.09)	(30.84)	(-4.97)	(0.41)	(-6.50)		(0.62)	(1.20)	(4.30)	(-6.33)	(4.93)	

Table 5 (Continued)

Panel B: Firms Classified by 2-digit SIC Code

Regression	Portfolios of Single-Segment Firms (1)						Portfolios of Multi-Segment Firms (2)						Zero-Investment Portfolios (3)					
Time Period	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
07/1981 – 06/2001	0.21***	0.91***	0.03	-0.30***	0.03	0.95	0.06	0.97***	-0.15***	0.04	-0.07***	0.94	0.15	-0.06*	0.17***	-0.34***	0.09***	0.40
(240 Months)	(2.78)	(47.32)	(1.19)	(-10.11)	(1.39)		(0.85)	(51.64)	(-6.09)	(1.57)	(-3.92)		(1.13)	(-1.67)	(4.12)	(-6.74)	(3.01)	
07/1981 – 06/1991	0.07	0.94***	-0.09***	-0.03	0.01	0.97	0.09	0.99***	-0.11***	-0.08***	0.03	0.98	-0.02	-0.05*	0.02	0.05	-0.02	0.04
(120 Months)	(1.01)	(55.25)	(-2.90)	(-0.85)	(0.63)		(1.44)	(67.98)	(-4.07)	(-2.71)	(1.59)		(-0.14)	(-1.87)	(0.37)	(0.92)	(-1.46)	
07/1991 – 06/2001	0.21**	0.96***	0.05**	-0.36***	0.01	0.95	0.11	0.89***	-0.14***	0.06	-0.10***	0.89	-0.10	0.07	0.19***	-0.42***	0.12***	0.63
(120 Months)	(1.97)	(31.30)	(1.83)	(-9.87)	(0.70)		(0.92)	(25.56)	(-4.22)	(1.41)	(-4.32)		(-0.51)	(1.22)	(3.69)	(-6.31)	(3.08)	

Table 11
Mergers Distribution by Year of Completion

The sample consists of U.S. firms, for which completed merger transactions are recorded in *Mergers & Acquisitions* (M&A) Roster, Acquisitions in the U.S., during 1990-1999. We select only independent publicly traded U.S. firms listed on NYSE, AMEX, or NASDAQ exchanges that were 100% acquired. Acquisitions of divisions and units, partial acquisitions (less than 100%), increase in interest in the firm, acquisition of remaining interest and acquisitions of bankrupt firms are excluded.
For both target and bidder firms in the sample, we obtain the segment data from COMPUSTAT active and research files for the fiscal year ending prior to the announcement date. A merger is classified as related or unrelated. A merger is related if a bidder has prior experience operating in the target's line(s) of business. Line of business is defined by SIC code of reported segments and its description in the fiscal year before the merger. A merger is unrelated if bidders acquire firms from completely unrelated lines of business. Some mergers could not be identified unambiguously as related or unrelated. These mergers are excluded from our analysis.

Completion Year	All Mergers	Related	Unrelated	Mixed	Diversified Mergers as a Percent of Total Mergers
1991	19	14	1	4	5.26%
1992	6	4	0	2	0.00%
1993	15	9	1	5	6.67%
1994	22	17	2	3	9.09%
1995	29	18	5	6	17.24%
1996	47	30	7	10	14.89%
1997	55	32	10	13	18.18%
1998	62	44	11	7	17.74%
1999	61	34	9	18	14.75%
Total	316	202	46	68	14.56%

Table 12
Buy-and-Hold Abnormal Returns

Abnormal buy-and-hold returns before merger are calculated months (-15, -4) relative to announcement date. Returns after the merger are calculated for months (+1, +12) relative to completion date. Raw returns are obtained from the CRSP database. Next, we calculate compound returns over the 12-months corresponding to the pre-announcement year (months –15, -4) and to the post-merger year (months +1, +12) for each firm and the corresponding value-weighted index that includes all stocks in the CRSP database. The abnormal buy-and-hold return is the difference between the buy-and-hold return on the stocks and the buy-and-hold return on the index. Finally, we average abnormal buy-and-hold returns across firms.
Returns change is the difference between post-merger buy-and-hold abnormal returns and pre-merger buy-and-hold returns on value-weighted portfolio of target and bidder.
Last column reports results of mean and median equality tests.
**, * denote statistical significance at 5% and 10% respectively.

Panel A: Before Merger

		Related	Unrelated	Test of Equality – Related vs. Unrelated
Target	Mean	-10.52%	-10.45%	0.01
	Median	-20.98%	-14.65%	1.52
Bidder	Mean	9.37%	14.97%	0.64
	Median	-3.36%	-5.01%	0.14
Portfolio	Mean	3.66%	11.71%	1.10
	Median	-2.45%	-3.51%	0.67

Panel B: After Merger

		Related	Unrelated	Test of Equality Related vs. Unrelated
Combined Firm	Mean	-11.32%	-25.81%	1.96**
	Median	-16.93%	-23.09%	2.56*
Return Change	Mean	-14.98%	-37.52%	2.21**
	Median	-14.11%	-18.12%	2.37

Table 13
Merger and Firms' Characteristics

This table reports merger characteristics and description of target and bidder firms in the fiscal year before the announcement and the bidder after the completion date.
Size of the transaction, the method of payment, and 4-week premia are obtained from M&A Roster.
Total assets, sales, debt to total assets ratio (DAT), EBIT to sales ratio (EBIT/Sales), capital expenditures to sales ratio (CAPX/Sales), and dividend yield (DivYld) are obtained from COMPUSTAT active and research files.

Panel A: Characteristics of Merger Transactions

Nature of Transaction	Related	Unrelated
Transaction Size (Millions $)		
Mean	756.05	582.38
Median	193.80	148.85
4-weeks premium (Percent)		
Mean	50.66%	42.75%
Median	42.59%	39.18%
Method of Payment (Number of Firms)		
Cash	75 (37%)	17 (35%)
Stock	108 (54%)	19 (41%)
Cash and Stock	19 (9%)	10 (24%)

Table 13 (Continued)

Panel B: Firms' Characteristics

	Fiscal Year before Merger Announcement Date				Fiscal Year after Merger Completion Date	
Firm	Target		Bidder		Combined Firm	
Nature of Transaction	Related	Unrelated	Related	Unrelated	Related	Unrelated
Assets (Millions of Dollars)						
Mean	428.24	486.29	2362.39	3808.03	3929.05	5562.41
Median	107.00	127.43	466.35	1236.45	1018.26	2232.04
Sales (Millions of Dollars)						
Mean	459.13	587.16	2523.30	3853.04	3443.75	5423.53
Median	118.08	131.16	512.95	857.46	977.27	1598.03
EBIT/Sales (Percent)						
Mean	-15.07	-11.35	-5.75	10.87	7.40	5.63
median	5.94	9.01	9.69	10.25	8.34	8.40
CAPX/Sales (Percent)						
Mean	11.19	13.87	16.00	17.61	13.04	11.21
Median	4.63	4.80	5.44	4.47	4.75	4.46
DivYld						
Mean	0.52	0.37	0.85	0.93	0.85	1.24
Median	0.00	0.00	0.00	0.09	0.00	0.33
DAT (Percent)						
Mean	26.11	23.66	22.89	27.57	27.38	34.84
Median	24.11	22.12	19.68	26.74	25.03	31.54

Table 14
Regression of Changes of Abnormal Returns on Pre-Merger Targets' and Bidders' Returns and on Firms' and Mergers' Characteristics

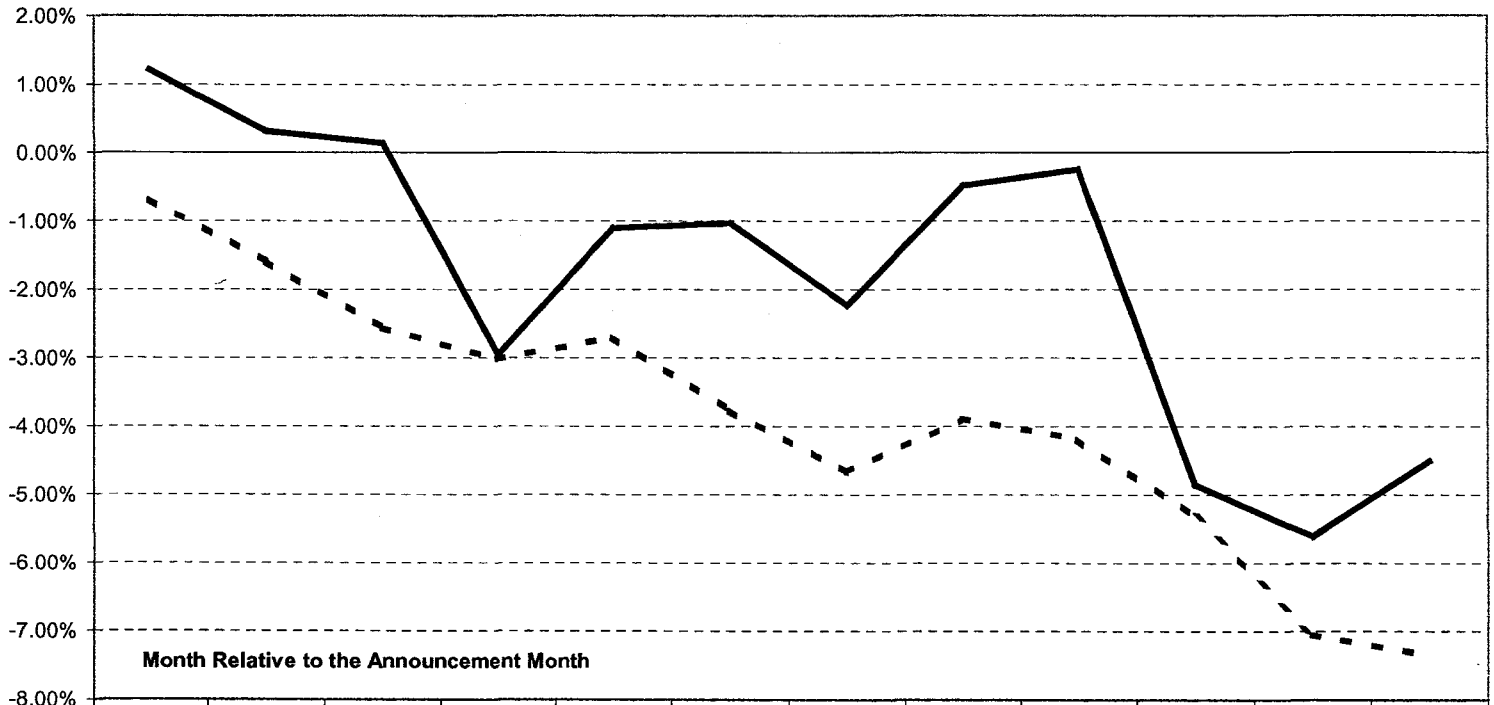
We estimate the following regression:

$$R_i = a_i + b_i X_i + c_i DDUM_i + \epsilon_i,$$

R_i is the post-merger buy-and-hold abnormal returns minus pre-merger buy-and-hold returns on value-weighted portfolio of target and bidder. DDUM is the dummy variable that equals to 1 if merger is unrelated and 0 otherwise. X_i is the vector of firms' and mergers' characteristics that includes the following variables: TRET (-1) – targets' pre-merger annual abnormal buy-and-hold returns, BRET (-1) - bidders' pre-merger annual abnormal buy-and-hold returns, TDAT (-1) – targets' debt ratio in the fiscal year before the merger, BDAT (-1) – bidders' debt ratio in the fiscal year before the merger, BDAT – bidders' debt ratio in the fiscal year after the merger.
t-values are reported in parenthesis.
***, **, * denote statistical significance on 1%, 5%, and 10% level respectively.

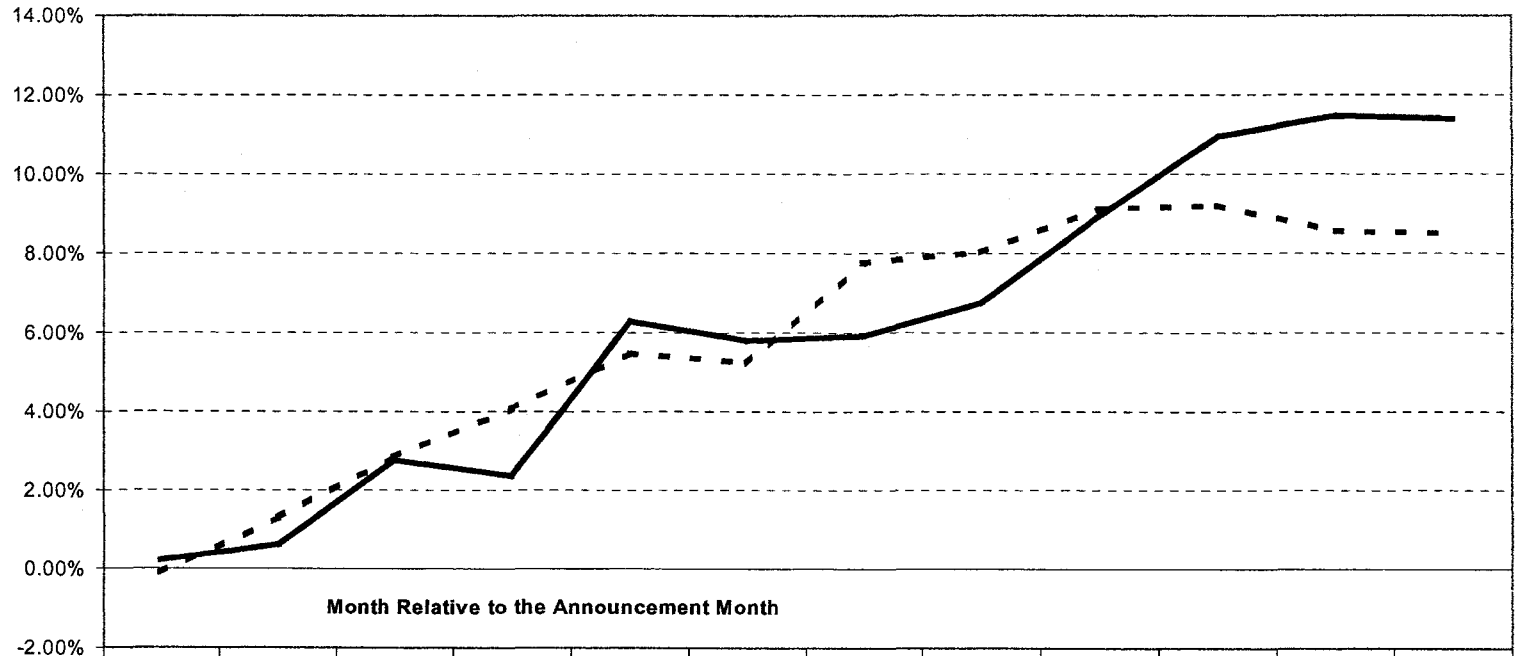
Independent Variables	Coefficients
Intercept	5.45 (0.93)
DDUM	-16.34** (-2.16)
TRET(-1)	-0.19*** (-3.38)
BRET(-1)	-0.74*** (-13.25)
TDAT(-1)	-0.29** (-2.12)
BDAT(-1)	0.42* (1.90)
BDAT	-0.63*** (-3.17)
Number of Observations	248
Adjusted R2	0.47
p-value of F-statistic	0.00

Figure 1
Targets' Average Cumulative Abnormal Returns before the Merger



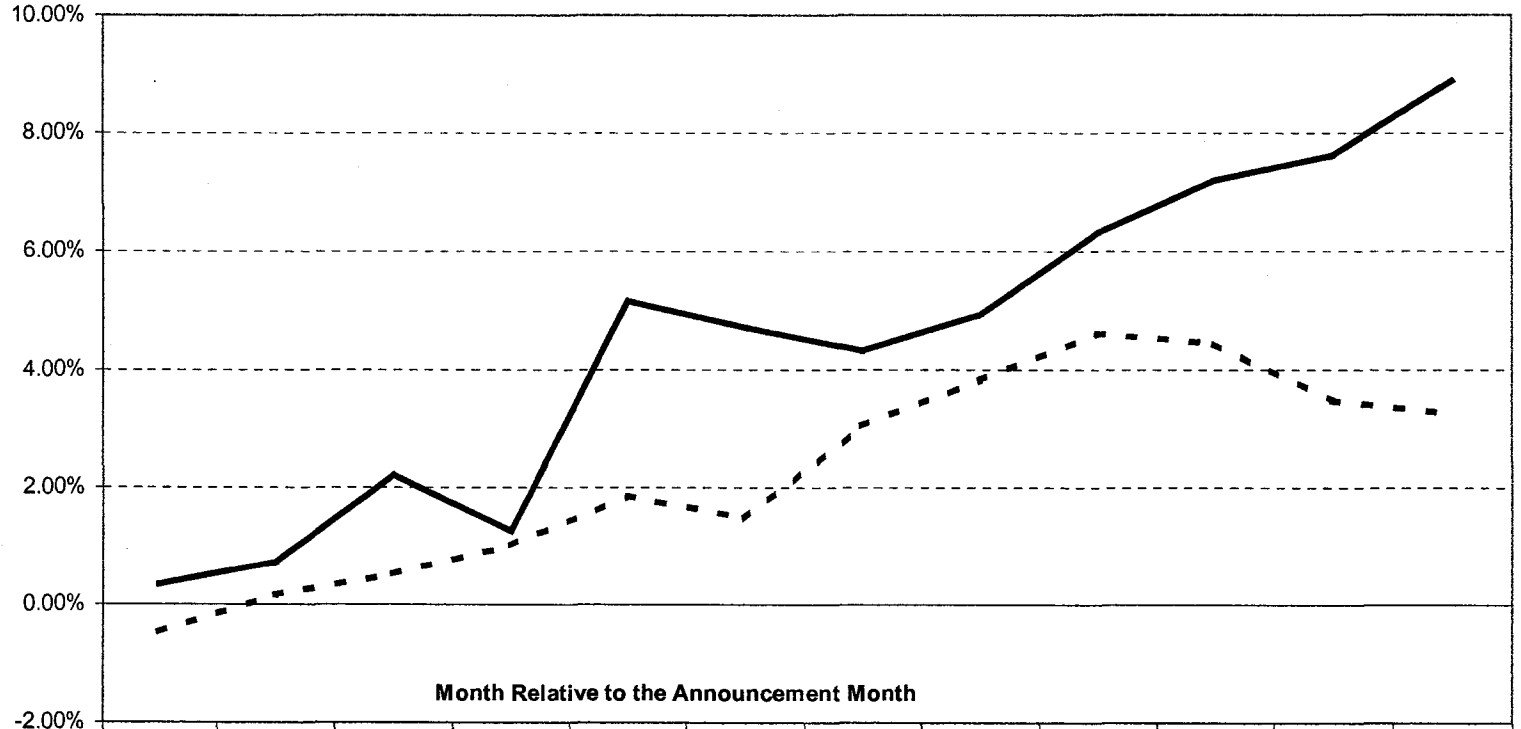
	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4
Related	-0.69%	-1.60%	-2.57%	-3.03%	-2.71%	-3.77%	-4.67%	-3.89%	-4.18%	-5.32%	-7.05%	-7.36%
Unrelated	1.22%	0.31%	0.14%	-2.97%	-1.11%	-1.04%	-2.24%	-0.48%	-0.25%	-4.85%	-5.61%	-4.51%

Figure 2
Bidders' Average Cumulative Abnormal Returns before the Merger



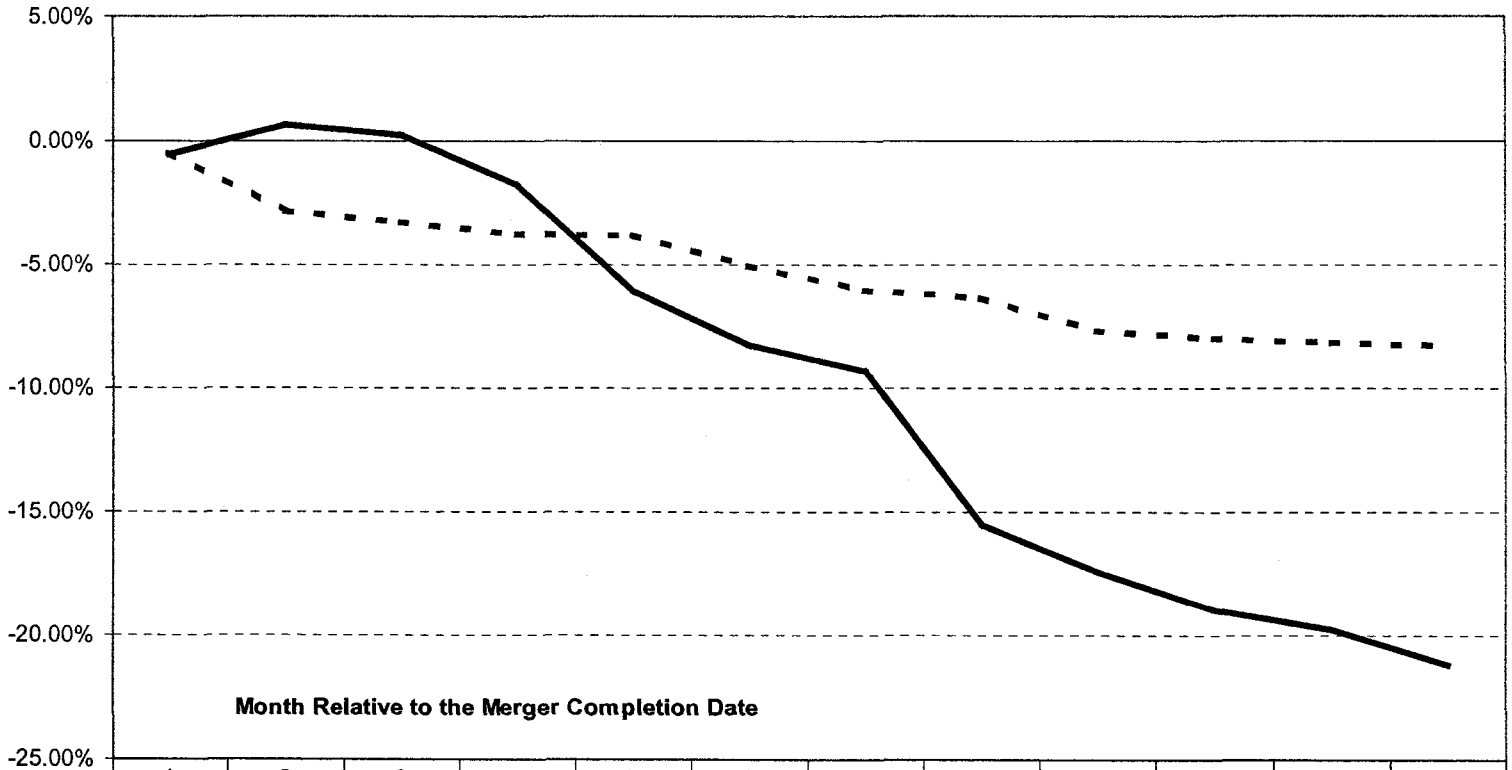
	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4
Related	-0.10%	1.32%	2.86%	4.06%	5.47%	5.21%	7.74%	8.01%	9.10%	9.18%	8.54%	8.50%
Unrelated	0.23%	0.64%	2.77%	2.37%	6.27%	5.79%	5.91%	6.74%	8.92%	10.94%	11.47%	11.38%

Figure 3
Average Cumulative Abnormal Returns of the Value-Weighted Portfolios of Target and Bidder Firms before the Merger



	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4
- - -Related	-0.48%	0.16%	0.50%	1.00%	1.84%	1.47%	3.05%	3.82%	4.61%	4.42%	3.47%	3.24%
——Unrelated	0.33%	0.71%	2.21%	1.25%	5.16%	4.70%	4.31%	4.93%	6.30%	7.21%	7.62%	8.88%

Figure 4
Average Cumulative Abnormal Returns of Combined Firms after the Merger



	1	2	3	4	5	6	7	8	9	10	11	12
- - -Related	-0.48%	-2.86%	-3.29%	-3.80%	-3.83%	-5.10%	-6.05%	-6.37%	-7.69%	-8.00%	-8.19%	-8.29%
——Unrelated	-0.57%	0.65%	0.24%	-1.78%	-6.09%	-8.28%	-9.31%	-15.53%	-17.38%	-18.96%	-19.76%	-21.16%

Table 6
Four-Factor Time-Series Regressions for Monthly Excess Returns for Portfolios of Domestic and Geographically Diversified Firms, and Returns on the Zero-Investment Portfolios

$$R_i^D - R_f = a_i + b_i(R_m - R_f) + s_i\,SMB + h_i\,HML + m_i\,MOMENTUM + \epsilon_i \quad (1)$$
$$R_i^G - R_f = a_i + b_i(R_m - R_f) + s_i\,SMB + h_i\,HML + m_i\,MOMENTUM + \epsilon_i \quad (2)$$
$$R_i^G - R_i^D = a_i + b_i(R_m - R_f) + s_i\,SMB + h_i\,HML + m_i\,MOMENTUM + \epsilon_i \quad (3)$$

$R_i^D - R_f$ are the monthly excess returns on value-weighted portfolios of domestic firms. $R_i^G - R_f$ are the monthly excess returns on value-weighted portfolios of geographically diversified firms. Firms are sorted into two portfolios –Domestic or Geographically diversified according to their reported percent of foreign sales (COMPUSTAT item TFSALEP). Firms that report foreign sales greater than 10% of the total sales are classified as geographically diversified. Portfolios are formed on July 1st of each year in the 1981 –1999 period and held for 12 months. If a firm stops trading during the year, its returns are replaced by the mean returns of the remaining portfolio. Returns on portfolios are calculated using CRSP. $R_i^G - R_i^D$ are the returns on the zero-investment portfolios formed by taking a long position in the portfolio of geographically diversified firms and short position in the portfolio of domestic firms on July 1st each year in the 1981 – 1999 period and held for 12 months. R_f are the monthly Treasury bill rate. $(R_m - R_f)$ are the value-weighted excess market returns on all NYSE/AMEX/NASDAQ firms. SMB (small minus big) is the difference each month between the returns on small firms and big firms. HML (high minus low) is the difference each month between return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks. MOMENTUM is the a momentum factor, constructed from six value-weight portfolios formed using independent sorts on size and prior return of NYSE, AMEX, and NASDAQ stocks. It is the average of the returns on two (big and small) high prior return portfolios minus the average of the returns on two low prior return portfolios. Prior return is measured from month -12 to -2. All returns are in percent.
Factors are obtained from K. French web page.
Regressions are performed for the whole time period 07/1981-06/2001 and two sub-periods corresponding to 1980s and 1990s.
*, **, *** denote significance at 10%, 5% and 1% level. Returns are in percent.

	Domestic Firms (1)						Geographically Diversified Firms (2)						Zero-Investment Portfolio (3)					
	a	**b**	**s**	**h**	**m**	**Adj. R^2**	**a**	**b**	**s**	**h**	**m**	**Adj. R^2**	**a**	**b**	**s**	**h**	**m**	**Adj. R^2**
07/1981 – 06/2001	-0.03	0.94***	0.03	-0.13***	0.00	0.95	0.28***	0.94***	-0.09***	-0.23***	-0.01	0.96	0.25**	0.01	-0.13***	-0.09**	-0.01	0.04
240 Months	(-0.48)	(53.33)	(1.46)	(-5.06)	(0.01)		(3.99)	(53.77)	(-4.15)	(-8.59)	(-0.67)		(2.12)	(0.21)	(-3.39)	(-2.12)	(-0.47)	
07/1981 – 06/1991	-0.00	0.95***	-0.03	0.01	0.06***	0.97	0.18**	0.98***	-0.16***	-0.14***	-0.03	0.97	0.19	0.02	-0.13**	-0.15**	-0.09**	0.08
120 Months	(-0.04)	(51.66)	(-0.93)	(0.34)	(2.56)		(2.38)	(54.52)	(-4.86)	(-3.80)	(-1.31)		(1.32)	(0.67)	(-2.12)	(-2.26)	(-2.15)	
07/1991 – 06/2001	-0.03	0.97***	0.06**	-0.17***	0.03	0.95	0.35***	0.92***	-0.09***	-0.27***	-0.01	0.94	0.38**	-0.05	-0.15***	-0.10*	0.02	0.04
120 Months	(-0.27)	(31.81)	(2.07)	(-4.55)	(1.47)		(3.05)	(27.76)	(-2.70)	(-6.77)	(-0.43)		(2.07)	(-0.86)	(-2.88)	(-1.63)	(0.57)	

Table 7
Four-Factor Time-Series Regressions for Monthly Excess Returns (in Percent) for Portfolios of Industrially and Geographically Diversified, and Returns on the Zero-Investment Portfolios

Regressions are performed for the whole time period 07/1981-06/2001 (Panel A) and two sub-periods corresponding to 1980s and 1990s (Panels B and C respectively). We perform regression analysis on the portfolios formed on the two independent sorts – according to their geographic diversification and the industrial diversification. See Table 1 for description of industrial diversification portfolio formation scheme and Table 4 for description of geographic diversification portfolio formation scheme.
Zero-investment portfolios are:
$R_i^S - R_i^M = a_i + b_i(R_m - R_f) + s_i SMB + h_i HML + m_i MOMENTUM + \epsilon_I$ (1)
$R_i^G - R_i^D = a_i + b_i(R_m - R_f) + s_i SMB + h_i HML + m_i MOMENTUM + \epsilon_i$ (2)

The F(GRS) statistic is calculated as follows:

$$F(GRS) = (A' \Sigma^{-1} A)(N - K - L + 1)/(L * (N - K)*w),$$

where N is the number of time series observations, L is the number of regressions (4 in our case), K is 1 plus the number of explanatory variables in the regression, A is the column vector of 4 regression intercepts, Σ (L x L) is the covariance matrix of the residuals from 4 regressions, and w is the diagonal element of $(X'X)^{-1}$ corresponding to the intercept. F(GRS) has an F-distribution with L and (N – K – L +1) degrees of freedom under the assumption that the returns and explanatory variables are normal and the true intercepts are 0 (Gibbons, Ross, and Shanken, 1989).
*, **, *** denote significance at 10%, 5% and 1% level.

Panel A: 07/1981 – 06/2001, 240 Months

Panel A1: Firms Classified by 4-digit SIC Code

	Domestic Firms						Geographically Diversified Firms						Zero-Investment Portfolio (2)					
	a	**b**	**s**	**h**	**m**	**Adj. R^2**	**a**	**b**	**s**	**h**	**m**	**Adj. R^2**	**a**	**b**	**s**	**h**	**m**	**Adj. R^2**
Single-segment Firms	0.09	0.91***	0.06**	-0.24***	0.04*	0.92	0.35***	0.93***	0.04	-0.38***	0.01	0.87	0.26	0.02	-0.03	-0.14**	-0.03	0.02
	(0.90)	(36.95)	(2.05)	(-6.44)	(1.77)		(2.60)	(27.29)	(0.87)	(-7.29)	(0.43)		(1.55)	(0.41)	(-0.49)	(-2.09)	(-0.68)	
Multi-segment Firms	-0.03	0.96***	-0.05*	0.07**	-0.08***	0.90	0.18*	0.96***	-0.20***	-0.03	-0.09***	0.91	0.21	-0.01	-0.15***	-0.11*	-0.01	0.03
	(-0.32)	(39.21)	(-1.66)	(1.99)	(-3.52)		(1.87)	(39.61)	(-6.62)	(-0.87)	(-3.85)		(1.39)	(-0.14)	(-3.14)	(-1.82)	(-0.20)	
Zero-Investment Portfolio (1)	0.12	-0.04	0.12***	-0.31***	0.12***	0.33	0.17	-0.03	0.24***	-0.34***	0.11**	0.31			F (GRS)			χ^2
	(0.88)	(-1.22)	(2.66)	(-6.06)	(3.78)		(0.95)	(-0.64)	(4.15)	(-4.96)	(2.35)				4.88***			11.17**

Table 7 (Continued)

Panel A2: Firms Classified by 2-digit SIC Code

	a	b	s	h	m	Adj. R2	a	b	s	h	m	Adj. R2	a	b	s	h	m	Adj. R2
Single-segment Firms	0.14	0.90***	0.05	-0.25***	0.02	0.90	0.32***	0.94***	0.00	-0.36***	0.01	0.90	0.18	0.04	-0.05	-0.11*	-0.01	0.03
	(1.31)	(34.28)	(1.58)	(-6.24)	(0.80)		(2.80)	(32.76)	(0.05)	(-8.29)	(0.50)		(1.17)	(1.10)	(-1.02)	(-1.90)	(-0.16)	
Multi-segment Firms	-0.15	1.00***	-0.04	0.20***	-0.04	0.86	0.19*	0.95***	-0.20***	-0.02	-0.08***	0.89	0.34**	-0.05	-0.15***	-0.21	-0.05	0.04
	(-1.27)	(33.71)	(-1.14)	(4.38)	(-1.27)		(1.85)	(36.42)	(-5.90)	(-0.46)	(-3.35)		(2.04)	(-1.10)	(-2.86)	(-3.36)	(-1.19)	
Zero-Investment Portfolio (1)	0.29*	-0.11**	0.10*	-0.44***	0.05	0.26	0.13	-0.02	0.20***	-0.34***	0.10*	0.32			F (GRS)			χ^2
	(1.62)	(-2.38)	(1.69)	(-6.60)	(1.32)		(0.76)	(-0.38)	(3.72)	(-5.38)	(2.43)				5.06***			14.60***

Table 7 (Continued)

Panel B: 07/1981 – 06/1991, 120 Months

Panel B1: Firms Classified by 4-digit SIC Code

	Domestic Firms						Geographically Diversified Firms						Zero-Investment Portfolio (2)					
	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
Single-segment Firms	0.05 (0.39)	0.92*** (32.07)	-0.06 (-1.19)	0.02 (0.38)	0.09** (2.41)	0.93	0.13 (0.71)	0.97*** (22.83)	-0.07 (-0.88)	-0.14* (-1.66)	-0.16*** (-2.83)	0.87	0.08 (0.32)	0.05 (0.76)	-0.01 (-0.05)	-0.16 (-1.38)	-0.25*** (-3.20)	0.08
Multi-segment Firms	-0.07 (-0.70)	0.98*** (42.72)	0.01 (0.13)	0.01 (0.14)	0.04 (1.36)	0.96	0.22*** (2.85)	0.98*** (53.90)	-0.21*** (-6.21)	-0.12*** (-3.21)	0.05* (1.92)	0.97	0.29** (2.13)	-0.00 (-0.09)	-0.21*** (-3.63)	-0.12** (-1.93)	0.01 (0.12)	0.08
Zero-Investment Portfolio (1)	0.12 (0.73)	-0.05 (-1.42)	-0.07 (-1.00)	0.02 (0.20)	0.05 (1.03)	0.02	-0.09 (-0.46)	-0.01 (-0.22)	0.14 (1.60)	-0.02 (-0.26)	-0.21*** (-3.27)	0.08			F (GRS) 3.22**			χ^2 9.24-*

Panel B2: Firms Classified by 2-digit SIC Code

	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
Single-segment Firms	0.05 (0.43))	0.91*** (32.08)	-0.09* (-1.73)	-0.06 (-1.07)	0.10*** (2.73)	0.92	0.13 (0.92)	0.97*** (28.76)	-0.09 (-1.43)	-0.15** (-2.20)	-0.10** (-2.32)	0.92	0.08 (0.37)	0.06 (1.16)	0.00 (0.02)	-0.21** (-2.01)	-0.21*** (-2.99)	0.12
Multi-segment Firms	-0.10 (-0.91)	1.01*** (39.71)	-0.07 (-1.39)	-0.04 (-0.84)	0.02 (0.47)	0.95	0.22*** (2.65)	0.98*** (51.51)	-0.21*** (-6.01)	-0.11*** (-2.91)	0.04 (1.49)	0.97	0.32** (2.25)	-0.03 (-1.07)	-0.28*** (-4.88)	-0.07 (-1.03)	0.02 (0.51)	0.15
Zero-Investment Portfolio (1)	0.15 (0.86)	-0.10*** (-2.46)	-0.16** (-2.06)	0.10 (1.26)	0.09 (1.60)	0.18	-0.08 (-0.49)	-0.01 (-0.16)	0.12* (1.70)	-0.04 (-0.50)	-0.14*** (-2.75)	0.07			F (GRS) 3.03**			χ^2 8.88*

Table 7 (Continued)

Panel C: 07/1991 - 06/2001, 120 Months

Panel C1: Firms Classified by 4-digit SIC Code

	Domestic Firms						Geographically Diversified Firms						Zero-Investment Portfolio (2)					
	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
Single-segment Firms	-0.06 (-0.45)	0.99*** (28.03)	0.11*** (3.33)	-0.28*** (-6.69)	0.01 (0.21)	0.94	0.54*** (2.93)	0.93*** (17.78)	0.02 (0.32)	-0.47*** (-7.58)	0.07** (2.00)	0.89	0.59*** (2.74)	-0.07 (-1.11)	-0.10* (-1.65)	-0.19*** (-2.56)	0.07 (1.57)	0.05
Multi-segment Firms	-0.06 (-0.37)	0.89*** (19.23)	-0.06 (-1.27)	0.07 (1.21)	-0.12*** (-3.92)	0.82	0.17 (0.97)	0.91*** (18.76)	-0.18*** (-3.81)	-0.01 (-0.22)	-0.14*** (-4.21)	0.83	0.11 (0.38)	0.02 (0.30)	-0.12 (-1.58)	-0.08 (-0.83)	-0.02 (-0.30)	-0.00
Zero-Investment Portfolio (1)	-0.12 (-0.63)	0.11** (2.12)	0.17*** (3.41)	-0.35*** (-5.67)	0.13*** (3.63)	0.63	0.37 (1.38)	0.02 (0.22)	0.19*** (2.62)	-0.46*** (-5.00)	0.21*** (4.01)	0.52			F (GRS) 3.50***			χ^2 9.85**

Panel C2: Firms Classified by 4-digit SIC Code

	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
Single-segment Firms	0.00 (0.03)	0.98*** (26.29)	0.11*** (3.07)	-0.30*** (-6.68)	-0.03 (-1.25)	0.94	0.45** (2.77)	0.94*** (20.12)	-0.01 (-0.24)	-0.44*** (-7.89)	0.05 (1.56)	0.91	0.45** (2.20)	-0.05 (-0.80)	-0.12** (-2.16)	-0.14** (-2.02)	0.08** (2.05)	0.05
Multi-segment Firms	-0.03 (-0.17)	0.89*** (16.23)	-0.07** (-1.36)	0.23*** (3.45)	-0.04 (-1.12)	0.74	0.21 (1.10)	0.89*** (16.73)	-0.17*** (-3.31)	-0.00 (-0.00)	-0.13*** (-3.54)	0.79	0.24 (0.78)	0.00 (0.08)	-0.10 (-1.16)	-0.23** (-2.15)	-0.09 (-1.46)	0.04
Zero-Investment Portfolio (1)	-0.04 (0.16)	0.10 (1.44)	0.18*** (2.79)	-0.52*** (-6.47)	0.01 (0.21)	0.58	0.25 (0.93)	0.04 (0.58)	0.16** (2.19)	-0.44*** (-4.86)	0.18*** (3.47)	0.49			F (GRS) 2.87**			χ^2 8.93*

Table 8
Regressions and F(GRS) of Excess Stock Returns on 36 portfolios Formed on Size, Book-to-market, Industrial, and Geographic Diversification of Four Factors.

All firms in our sample are independently sorted into portfolios according to the industrial and geographic diversification (See Table 3 for details). Next, firms are independently allocated into portfolios according to their size (market capitalization at the end of the previous fiscal year) and book-to-market ratios (at the end of the previous fiscal year). Firms with the market capitalization at the end of the previous fiscal year in the lowest two quintiles are classified as "Small", in the upper two quintiles are classified as "Large", the middle 20 percent are the "Medium". Book-to-market classification is done in the same manner. The intersection of these classifications (industrial and geographic diversification, size and book-to-market) result in 36 portfolios, 9 portfolios per each diversification classification.
We run the four-factor regression (see Tables 4, 5 and 6 for details) on each of these 36 portfolios and compute the F(GRS) statistic for each diversification category.

$$F(GRS) = (A' \Sigma^{-1} A)(N - K - L + 1)/(L * (N - K)*w),$$

where N is the number of time series observations, L is the number of regressions (9 per each diversification category), K is 1 plus the number of explanatory variables in the regression, A is the column vector of 4 regression intercepts, Σ (L x L) is the covariance matrix of the residuals from 4 regressions, and w is the diagonal element of $(X'X)^{-1}$ corresponding to the intercept. F(GRS) has an F-distribution with L and (N – K – L +1) degrees of freedom under the assumption that the returns and explanatory variables are normal and the true intercepts are 0 (Gibbons, Ross, and Shanken, 1989).
*, **, *** denote significance at 10%, 5% and 1% level.

Table 8 (Continued)

Panel A: 07/1981 – 06/2001, 240 Months

Panel A1: Single-Segment Firms

	Domestic Firms						Geographically Diversified Firms					
Size/ Book-to-Market	**a**	**b**	**s**	**h**	**m**	**Adj. R^2**	**a**	**b**	**s**	**h**	**m**	**Adj. R^2**
Small/Low	-0.11 (-0.47)	0.90*** (16.03)	1.43*** (20.06)	-0.22*** (-2.60)	-0.15*** (-2.93)	0.83	0.11 (0.33)	0.94*** (11.19)	1.11*** (10.46)	-0.47*** (-3.71)	-0.31*** (-3.95)	0.69
Small/Medium	0.45*** (2.65)	0.86*** (20.18)	1.31*** (24.04)	-0.00 (-0.08)	0.03 (0.74)	0.87	0.46 (1.32)	0.80*** (9.28)	1.56*** (14.16)	-0.35*** (-2.64)	0.07 (0.85)	0.71
Small/High	-0.35** (2.28)	0.83*** (21.32)	1.18*** (23.84)	0.37*** (6.27)	-0.06 (-1.57)	0.84	0.54** (2.19)	0.96*** (15.61)	1.31*** (16.78)	0.36*** (3.84)	-0.04 (-0.77)	0.74
Medium/Low	0.00 (0.01)	1.11*** (35.11)	1.26*** (31.30)	-0.17*** (-3.60)	-0.01 (-0.33)	0.94	0.32 (1.56)	1.05*** (20.39)	1.32*** (20.11)	-0.25*** (-3.26)	-0.04 (-0.79)	0.87
Medium/Medium	0.23* (1.78)	0.96*** (29.15)	1.17*** (27.81)	0.23*** (4.70)	0.06* (1.80)	0.91	0.66*** (2.85)	1.11*** (19.10)	0.97*** (13.18)	0.11 (1.30)	-0.14*** (-2.52)	0.77
Medium/High	0.08 (0.65)	0.96*** (30.25)	0.90*** (22.42)	0.52*** (10.87)	-0.02 (-0.66)	0.87	0.64*** (3.03)	1.03*** (19.35)	1.08*** (15.91)	0.29*** (3.61)	-0.07 (-1.37)	0.78
Large/Low	0.04 (0.32)	1.06*** (37.54)	0.07** (1.91)	-0.50*** (-11.82)	0.01 (0.57)	0.93	0.43*** (2.80)	0.94*** (23.99)	0.01 (0.21)	-0.59*** (-9.92)	-0.00 (-0.06)	0.86
Large/Medium	0.03 (0.15)	0.0*** (19.49)	0.00 (0.05)	0.28*** (4.06)	0.07* (1.64)	0.65	0.09 (0.40)	1.06*** (18.38)	0.14* (1.85)	0.26*** (2.93)	0.13** (2.42)	0.64
Large/High	0.17 (0.99)	0.76*** (17.94)	-0.02 (-0.35)	0.24*** (3.71)	-0.05 (1.35)	0.61	0.10 (0.35)	1.05*** (14.11)	0.48*** (5.09)	0.52*** (4.60)	-0.11 (-1.56)	0.50
χ^2	17.15**						34.52***					
F (GRS)	3.21***						2.33**					

Table 8 (Continued)

Panel A2: Multi-Segment Firms

	Domestic Firms						Geographically Diversified Firms					
Size/ Book-to-Market	**a**	**b**	**s**	**h**	**m**	**Adj. R^2**	**a**	**b**	**s**	**h**	**m**	**Adj. R^2**
Small/Low	-0.65** (-1.93)	0.98*** (11.62)	1.46*** (13.67)	-0.02 (-0.18)	0.00 (0.04)	0.69	0.06 (0.12)	1.16*** (8.82)	1.33*** (7.83)	-0.40** (-1.99)	-0.15 (-1.20)	0.54
Small/Medium	0.08 (0.31)	0.91*** (13.83)	1.15*** (13.65)	0.32*** (3.23)	-0.20*** (-3.19)	0.67	-0.50 (-1.04)	0.91*** (7.55)	1.00*** (6.51)	0.02 (0.13)	-0.24** (-2.10)	0.39
Small/High	0.22 (1.25)	0.90*** (20.25)	1.20*** (21.36)	0.50*** (7.46)	0.03 (0.73)	0.81	0.50* (1.91)	0.92*** (14.01)	1.22*** (14.60)	0.42*** (4.24)	-0.13** (-2.03)	0.67
Medium/Low	-0.44** (-2.20)	1.04*** (20.90)	0.95*** (15.11)	-0.10 (-1.29)	-0.17*** (-3.54)	0.83	-0.16 (-0.44)	1.01*** (11.32)	1.40*** (12.38)	-0.37*** (-2.76)	0.08 (1.00)	0.71
Medium/Medium	0.31 (1.34)	0.97*** (16.86)	0.73*** (10.05)	0.28*** (3.29)	-0.22*** (-4.08)	0.67	0.33 (0.92)	1.06*** (11.82)	1.35*** (11.86)	0.26* (1.92)	-0.02 (-0.28)	0.62
Medium/High	0.10 (0.70)	0.96*** (30.04)	0.94*** (23.11)	0.51*** (10.54)	-0.01 (-0.27)	0.87	-0.22 (-0.97)	1.09*** (19.48)	1.04*** (14.64)	0.62*** (7.39)	-0.05 (-0.90)	0.73
Large/Low	0.07 (0.49)	1.00*** (27.92)	-0.12*** (-2.85)	-0.23*** (-4.21)	-0.14*** (-4.15)	0.85	0.27** (2.19)	0.92*** (29.85)	-0.32*** (-8.37)	-0.21*** (-4.47)	-0.06** (-1.98)	0.86
Large/Medium	-0.05 (-0.31)	1.02*** (25.14)	0.00 (0.06)	0.37*** (6.01)	-0.07* (-1.81)	0.75	0.01 (0.06)	1.08*** (23.99)	-0.06 (-0.98)	0.18*** (2.61)	-0.11*** (-2.61)	0.76
Large/High	-0.22* (-1.87)	0.85*** (29.15)	-0.03 (-0.82)	0.61*** (13.88)	0.04 (1.50)	0.78	0.00 (0.03)	1.09*** (27.84)	0.15*** (2.96)	0.59*** (9.97)	-0.15*** (-4.19)	0.78
χ^2	16.38*						11.51					
F (GRS)	2.46**						1.44					

Table 8 (Continued)

Panel B: 07/1981 – 06/1991, 120 Months

Panel B1: Single-Segment Firms

	Domestic Firms						Geographically Diversified Firms					
Size/ Book-to-Market	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
Small/Low	-0.48**	0.96***	1.24***	-0.18*	-0.06	0.87	-0.04	0.92***	1.16***	-0.32*	-0.21*	0.75
	(-2.00)	(17.18)	(11.96)	(-1.64)	(-0.86)		(-0.12)	(11.15)	(7.63)	(-1.92)	(-1.88)	
Small/Medium	0.42***	0.88***	1.15***	-0.01	0.03	0.91	-0.33	0.83***	1.27***	0.04	-0.02	0.68
	(2.49)	(21.84)	(15.46)	(-0.06)	(0.60)		(-0.92)	(9.79)	(8.11)	(0.23)	(-0.18)	
Small/High	0.08	0.84***	1.16***	0.31***	0.06	0.92	0.25	0.98***	1.22***	0.21	0.09	0.78
	(0.54)	(25.28)	(19.06)	(4.61)	(1.30)		(0.82)	(13.90)	(9.40)	(1.47)	(0.96)	
Medium/Low	-0.12	1.12***	1.00***	-0.36***	-0.05	0.96	-0.23	1.04***	1.08***	-0.32***	-0.20***	0.89
	(-0.81)	(33.31)	(16.18)	(-5.38)	(-1.18)		(-0.99)	(19.03)	(10.72)	(-2.96)	(-2.75)	
Medium/Medium	0.27	0.98***	1.04***	0.05	0.10*	0.91	0.56**	1.07***	1.03***	-0.26**	-0.07	0.85
	(1.56)	(24.10)	(13.85)	(0.67)	(1.80)		(2.07)	(16.76)	(8.79)	(-2.04)	(-0.86)	
Medium/High	0.17	0.90***	0.92***	0.38***	0.05	0.90	0.23	1.00***	0.97***	0.13	-0.01	0.82
	(1.05)	(24.32)	(13.56)	(5.17)	(0.99)		(0.91)	(16.61)	(8.67)	(1.07)	(-0.12)	
Large/Low	0.18	1.06***	0.28***	-0.54***	0.12***	0.95	0.26	0.94***	0.08	-0.60***	-0.18**	0.84
	(1.32)	(32.16)	(4.63)	(-8.23)	(2.72)		(1.09)	(16.95)	(0.82)	(-5.41)	(-2.42)	
Large/Medium	-0.12	0.87***	-0.12	0.08	0.31***	0.70	0.29	1.06***	-0.03	-0.05	0.09	0.73
	(-0.44)	(14.08)	(-1.06)	(0.64)	(3.69)		(0.93)	(14.69)	(-0.23)	(-0.38)	(0.91)	
Large/High	0.05	0.83***	-0.50***	0.43***	0.08	0.76	0.09	1.16***	0.13	0.88	-0.40	0.59
	(0.28)	(18.46)	(-5.98)	(4.78)	(1.39)		(0.23)	(12.27)	(0.73)	(4.64)	(-3.18)	
χ^2	16.66**						9.71					
F (GRS)	2.80***						1.01					

Table 8 (Continued)

Panel B2: Multi-Segment Firms

	Domestic Firms						Geographically Diversified Firms					
Size/ Book-to-Market	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
Small/Low	-0.68** (-2.39)	0.97*** (14.52)	1.19*** (9.72)	-0.12 (-0.89)	-0.15* (1.69)	0.82	0.27 (0.41)	1.32*** (8.66)	1.35*** (4.79)	0.06 (0.20)	-0.13 (-0.66)	0.57
Small/Medium	-0.30 (-1.25)	0.93*** (16.37)	1.18*** (11.23)	0.12 (1.06)	-0.07 (-0.88)	0.84	-0.75* (-1.75)	0.87*** (8.56)	0.97*** (5.22)	-0.24 (-1.20)	0.23* (1.71)	0.62
Small/High	0.01 (0.07)	0.85*** (19.98)	1.14*** (14.54)	0.28*** (3.28)	0.12** (2.11)	0.88	0.34 (1.12)	0.93*** (12.91)	1.18*** (8.89)	0.17 (1.17)	0.03 (0.35)	0.76
Medium/Low	-0.44*** (-2.52)	1.02*** (25.06)	0.96*** (12.84)	-0.15* (-1.86)	-0.14*** (-2.62)	0.92	-0.11 (-0.33)	1.16*** (15.01)	1.15*** (8.12)	-0.26* (-1.66)	-0.13 (-1.31)	0.82
Medium/Medium	0.11 (0.56)	0.96*** (21.26)	0.94*** (11.39)	0.08 (0.88)	-0.03 (-0.47)	0.89	0.47 (1.21)	1.04*** (11.35)	1.08*** (6.38)	-0.05 (-0.28)	-0.06 (-0.48)	0.71
Medium/High	0.16 (1.05)	0.97*** (26.64)	0.84*** (12.59)	0.32*** (4.37)	0.02 (0.48)	0.91	-0.23 (-0.83)	1.11*** (16.96)	1.02*** (8.47)	0.36*** (2.78)	-0.09 (-1.08)	0.81
Large/Low	-0.00 (-0.02)	1.01*** (31.51)	0.05 (0.79)	-0.42*** (-6.58)	0.02 (0.40)	0.94	0.37*** (3.14)	0.92*** (33.59)	-0.36*** (-7.11)	-0.41*** (-7.41)	0.11*** (2.93)	0.95
Large/Medium	-0.08 (-0.40)	1.04*** (21.27)	0.02 (0.24)	0.02 (0.22)	0.07 (1.02)	0.85	-0.03 (-0.14)	1.08*** (23.65)	-0.10 (-1.24)	0.03 (0.35)	0.14** (2.21)	0.87
Large/High	-0.02 (-0.14)	0.91*** (29.38)	-0.13** (-2.36)	0.44*** (7.06)	0.07* (1.81)	0.89	0.22 (1.18)	1.08*** (24.95)	0.05 (0.62)	0.32*** (3.72)	-0.18*** (-3.16)	0.87
χ^2	15.23*						18.02**					
F (GRS)	1.66						2.46**					

Table 8 (Continued)

Panel C: 07/1991 – 06/2001, 120 Months

Panel C1: Single-Segment Firms

Size/ Book-to-Market	a	b	s	h	m	Adj. R^1	a	b	s	h	m	Adj. R^2
Small/Low	0.25 (0.64)	0.84*** (7.68)	1.50*** (14.45)	-0.24* (-1.85)	-0.21*** (-2.84)	0.82	0.16 (0.27)	1.00*** (6.02)	1.11*** (7.01)	-0.50*** (-2.53)	-0.35*** (-3.10)	0.65
Small/Medium	0.43 (1.45)	0.87*** (10.11)	1.37*** (16.72)	0.02 (0.16)	0.01 (0.24)	0.85	1.04* (1.79)	0.90*** (5.45)	1.62*** (10.29)	-0.43** (-2.19)	0.06 (0.54)	0.73
Small/High	0.65** (2.33)	0.80*** (10.08)	1.20*** (15.91)	0.38*** (4.04)	-0.11** (-2.01)	0.78	0.87** (2.23)	0.90*** (8.12)	1.37*** (12.92)	0.40*** (3.03)	-0.11 (-1.45)	0.71
Medium/Low	0.14 (0.74)	1.10*** (19.48)	1.36*** (25.26)	-0.08 (-1.14)	-0.02 (-0.41)	0.94	0.89*** (2.70)	1.08*** (11.56)	1.38*** (15.47)	-0.21* (-1.85)	-0.00 (-0.06)	0.87
Medium/Medium	0.25 (1.31)	0.91*** (16.61)	1.23*** (23.54)	0.30*** (4.55)	0.03 (0.80)	0.91	0.91*** (2.46)	1.07*** (10.17)	0.99*** (9.88)	0.23* (1.85)	-0.16** (-2.19)	0.70
Medium/High	-0.02 (-0.10)	1.02*** (18.23)	0.93*** (17.41)	0.60*** (9.04)	-0.05 (-1.19)	0.84	1.07*** (3.15)	1.05*** (10.90)	1.14*** (12.44)	0.37*** (3.22)	-0.11* (-1.66)	0.74
Large/Low	-0.06 (-0.35)	1.02*** (21.36)	0.01 (0.15)	-0.53*** (-9.19)	-0.01 (-0.16)	0.92	0.72*** (3.68)	0.90*** (16.28)	-0.06 (-1.16)	-0.62*** (-9.43)	0.07** (1.95)	0.89
Large/Medium	0.13 (0.55)	0.93*** (13.69)	0.12* (1.88)	0.40*** (4.98)	-0.04 (-0.84)	0.63	-0.01 (-0.03)	1.03*** (10.52)	0.22** (2.34)	0.38*** (3.26)	0.14** (2.07)	0.53
Large/High	0.04 (0.17)	0.81*** (11.98)	0.18*** (2.79)	0.25*** (3.15)	-0.16*** (-3.34)	0.61	0.01 (0.02)	1.03*** (8.61)	0.52*** (4.56)	0.39*** (2.76)	-0.02 (0.24)	0.47
χ^2	10.68						45.01***					
F (GRS)	1.58						3.05***					

Table 8 (Continued)

Panel C2: Multi-Segment Firms

Size/ Book-to-Market	a	b	s	h	m	Adj. R^2	a	b	s	h	m	Adj. R^2
Small/Low	-0.63 (-1.01)	1.02*** (5.80)	1.55*** (9.20)	0.06 (0.27)	0.04 (0.33)	0.63	-0.19 (-0.22)	1.00*** (4.09)	1.25*** (5.36)	-0.65** (-2.23)	-0.15 (-0.87)	0.52
Small/Medium	0.59 (1.27)	0.81*** (6.07)	1.15*** (9.05)	0.35** (2.18)	-0.25*** (-2.74)	0.54	-0.31 (-0.36)	0.95*** (3.87)	1.13*** (4.82)	0.18 (0.60)	-0.44*** (-2.58)	0.30
Small/High	0.45 (1.47)	0.93*** (10.86)	1.27*** (15.44)	0.61*** (5.93)	-0.02 (-0.28)	0.76	0.74* (1.74)	0.86*** (7.04)	1.28*** (11.04)	0.50*** (3.45)	-0.20** (-2.33)	0.61
Medium/Low	-0.43 (-1.16)	1.05*** (10.06)	0.96*** (9.65)	-0.07 (-0.56)	-0.17** (-2.42)	0.75	-0.11 (-0.17)	0.81*** (4.48)	1.40*** (8.12)	-0.49** (2.26)	0.16 (1.27)	0.66
Medium/Medium	0.64 (1.56)	0.88*** (7.54)	0.69*** (6.20)	0.30** (2.19)	-0.28*** (-3.49)	0.49	0.21 (0.34)	1.09*** (6.25)	1.49*** (8.96)	0.43** (2.05)	-0.03 (-0.26)	0.56
Medium/High	0.07 (0.36)	0.93*** (16.27)	1.00*** (18.36)	0.58*** (8.56)	-0.03 (-0.68)	0.84	-0.02 (-0.05)	0.97*** (9.86)	1.03*** (11.08)	0.66*** (5.66)	-0.02 (-0.37)	0.64
Large/Low	0.28 (1.22)	0.89*** (13.42)	-0.17*** (-2.66)	-0.22*** (-2.74)	-0.19*** (-4.07)	0.76	0.21 (1.05)	0.86*** (15.25)	-0.27*** (-4.94)	-0.13** (-1.99)	-0.12*** (-3.16)	0.79
Large/Medium	0.16 (0.74)	0.89*** (14.44)	0.03 (0.56)	0.45*** (6.06)	-0.12*** (-2.81)	0.66	0.03 (0.09)	1.07*** (12.83)	0.02 (0.30)	0.25*** (2.52)	-0.22*** (-3.75)	0.65
Large/High	-0.32* (-1.80)	0.74*** (14.89)	0.02 (0.32)	0.65*** (10.68)	0.03 (0.74)	0.67	-0.13 (-0.51)	1.07*** (15.06)	0.20*** (3.02)	0.70*** (8.21)	-0.15*** (-2.98)	0.66
χ^2	13.98						4.71					
F (GRS)	2.26*						0.67					

Table 9
Average Slopes from Monthly Fama-McBeth Regressions for Individual Stocks.

For each month in the sample period, from July 1981 to June 2001, the following regression is estimated:

$$R_i = a_i + b_i X_i + c_i D_i + \epsilon_i ,$$

where, R_i are the monthly raw returns of each stock. X_i is the vector of firms' characteristics that includes the following variables: BM –log of book-to-market ratio in the previous fiscal year. SIZE – log of market capitalization at the end of month t (-2). PRICE – log of price reciprocal at the end of month t(-2). DVOL – the dollar volume of trading in the month t (-2). It is approximated by stock price at the end of month t(-2) multiplied by share volume in month t(-2). DIVYLD – the ratio of dividends in the previous fiscal year to market capitalization at the calendar year end (not in logs). RET6 – Compounded gross returns for months t(-6) through t (-2). RET12 – Compounded gross returns for months t(-12) and t (-2). CAPX/SALES – is the ratio of capital expenditures to sales in the previous fiscal year. EBIT/SALES - is the ratio of earnings before interest and taxes to sales in the previous fiscal year. DAT – the debt ratio in the previous fiscal year. D_i is the vector of variables that captures industrial and geographic diversification: INDDUM – industrial diversification dummy. GEODUM – geographic diversification dummy. We follow the method of Fama and MacBeth (1973) and estimate the above regression separately for each month. Next, we calculate the mean and the t-statistics of the monthly coefficient estimates for the entire period from July 1981 to June 2001 (240 months), and for two sub-periods corresponding to 1980s and 1990s. Regression 3 is run for the single-segment firms and regression 4 - for multi-segment firms. The last column represents the difference between the average slopes of single-segment firms and the average slopes of multi-segment firms. Time series statistics are in parenthesis.
*, **, *** denote significance at 10%, 5% and 1% level.

Panel A: 07/1981 – 06/2001, 240 Months

	1	2	3	4	5
Intercept	0.54 (0.85)	0.55 (0.85)	0.23 (0.35)	1.15* (1.76)	-0.92*** (-2.68)
BM	0.32*** (4.36)	0.32*** (4.35)	0.33*** (4.17)	0.36*** (4.11)	-0.03 (-0.40)
SIZE	0.43*** (4.43)	0.43*** (4.42)	0.48*** (4.93)	0.33*** (3.29)	0.15** (2.39)
PRICE	1.19*** (9.24)	1.19*** (9.23)	1.28*** (9.32)	0.89*** (7.82)	0.40*** (4.96)
DVOL	-0.10 (-1.16)	-0.10 (-1.15)	-0.10 (-1.13)	-0.12 (-1.44)	0.02 (0.36)
RET6	0.01* (1.88)	0.01* (1.82)	0.00 (1.11)	0.01* (1.74)	-0.00 (-1.00)
RET12	0.01*** (7.76)	0.01*** (7.74)	0.01*** (8.45)	0.01*** (4.82)	0.01* (1.69)
DIVYIELD	0.03 (1.59)	0.03 (1.58)	0.02 (1.21)	0.03 (1.34)	-0.01 (-0.34)
CAPX/SALE	-0.69*** (-3.54)	-0.69*** (-3.53)	-0.57*** (-2.90)	-0.94*** (-2.60)	0.37 (1.12)
EBIT/SALE	0.73*** (2.47)	0.73*** (2.48)	0.41 (1.30)	1.73*** (3.24)	-1.32*** (-2.61)
DAT	-0.01*** (-4.59)	-0.01*** (-4.70)	-0.01*** (-4.59)	-0.01*** (-3.07)	-0.00 (-1.59)
GEODUM	0.14** (2.04)	0.13 (1.45)	0.10 (1.16)	0.15* (1.73)	0.01 (-0.47)
INDDUM	-0.09 (-1.51)	-0.08 (-1.18)			
GEODUM*INDDUM		-0.01 (-0.11)			

Table 9 (Continued)

Panel B: 07/1981 – 06/1991, 120 Months

	1	2	3	4	5
Intercept	0.95 (1.17)	0.97 (1.19)	0.75 (0.88)	0.91 (1.09)	-0.16 (-0.38)
BM	0.36*** (4.33)	0.36*** (4.33)	0.39*** (4.10)	0.39*** (3.47)	0.01 (0.05)
SIZE	0.35*** (3.66)	0.35*** (3.64)	0.40*** (3.98)	0.30*** (2.83)	0.10 (1.17)
PRICE	0.60*** (8.41)	0.60*** (8.42)	0.64*** (8.53)	0.51*** (6.01)	0.13** (1.96)
DVOL	-0.16** (-1.95)	-0.16** (-1.94)	-0.17** (-1.92)	-0.16* (-1.80)	-0.02 (-0.26)
RET_6	0.00 (0.25)	0.00 (0.25)	-0.00 (-0.94)	0.00 (1.08)	-0.01* (-1.85)
RET_12	0.01*** (5.70)	0.01*** (5.73)	0.01*** (6.38)	0.01*** (3.04)	0.01** (2.29)
DIVYIELD	0.05* (1.64)	0.05* (1.62)	0.04 (1.14)	0.06** (1.93)	-0.02 (-1.14)
CAPX/SALE	-1.08*** (-3.78)	-1.08*** (-3.78)	-0.78*** (-2.90)	-2.11*** (-3.98)	1.33*** (2.75)
EBIT/SALE	1.00** (2.17)	1.00** (2.19)	0.36 (0.73)	2.71*** (3.64)	-2.34*** (-3.15)
DAT	-0.01*** (-3.45)	-0.01*** (-3.69)	-0.01*** (-3.03)	-0.01*** (-2.86)	-0.00 (-0.40)
GEODUM	0.03 (0.37)	-0.04 (-0.34)	-0.07 (-0.65)	0.14 (1.39)	-0.22* (-1.69)
INDDUM	-0.13* (-1.86)	-0.17** (-2.17)			
GEODUM*INDDUM		0.15 (1.11)			

Table 9 (Continued)

Panel C: 07/1991 – 06/2001, 120 Months

	1	2	3	4	5
Intercept	0.14 (0.14)	0.12 (0.12)	-0.29 (-0.29)	1.39 (1.38)	-1.68*** (-3.14)
BM	0.28** (2.30)	0.28** (2.30)	0.27** (2.12)	0.34** (2.46)	-0.07 (-0.64)
SIZE	0.51*** (3.01)	0.51*** (3.01)	0.57*** (3.37)	0.36** (2.10)	0.21** (2.14)
PRICE	1.78*** (7.54)	1.77*** (7.53)	1.93*** (7.64)	1.27*** (6.17)	0.66*** (4.68)
DVOL	-0.03 (-0.22)	-0.03 (-0.22)	-0.02 (-0.16)	-0.08 (-0.58)	0.06 (0.70)
RET_6	0.01*** (2.50)	0.01** (2.43)	0.01*** (2.60)	0.01 (1.36)	0.00 (0.37)
RET_12	0.01*** (5.27)	0.01*** (5.22)	0.01*** (5.60)	0.01*** (3.80)	-0.00 (-0.23)
DIVYIELD	0.01 (0.37)	0.01 (0.37)	0.01 (0.45)	0.00 (0.01)	0.01 (0.32)
CAPX/SALE	-0.30 (-1.15)	-0.30 (-1.14)	-0.36 (-1.26)	0.23 (0.49)	-0.59 (-1.36)
EBIT/SALE	0.46 (1.24)	0.46 (1.23)	0.45 (1.17)	0.75 (0.99)	-0.30 (-0.45)
DAT	-0.01*** (-3.29)	-0.01*** (-3.27)	-0.02*** (-3.48)	-0.01* (-1.81)	-0.01* (-1.80)
GEODUM	0.26** (2.31)	0.30** (2.27)	0.28** (2.13)	0.16 (1.12)	0.12 (0.75)
INDDUM	-0.04 (-0.44)	0.02 (0.15)			
GEODUM*INDDUM		-0.17 (-1.08)			

Table 10
Average Slopes from Monthly Fama-McBeth Regressions for Surviving Firms.

This sample contains only firms that were present in the market in 1980. No new firms are added to the portfolios. If a firm exits the sample it is not replaced. For each month in the sample period, from July 1981 to June 2001, the following regression is estimated:
$R_i = a_i + b_i X_i + c_i D_i + e_i$,
where, R_i are the monthly raw returns of each stock. X_i is the vector of firms' characteristics and D_i is the vector of variables that captures industrial and geographic diversification (see Table 9 for variables description).
Regression 3 is performed for the single-segment firms and regression 4 - for multi-segment firms. The last column represents the difference between the average slopes of single-segment firms and the average slopes of multi-segment firms. Time series statistics are in parenthesis.
*, **, *** denote significance at 10%, 5% and 1% level.

Panel A: 07/1981 – 06/2001, 240 Months

Regression	1	2	3	4	5
Intercept	1.44** 2.32	1.45** 2.32	1.40** 2.21	1.18* 1.64	0.23 0.46
BM	0.32*** 3.70	0.31*** 3.69	0.29*** 2.8	0.40*** 3.69	-0.12 -0.96
SIZE	0.17* 1.76	0.17* 1.76	0.17* 1.77	0.18 1.53	-0.01 -0.1
PRICE	0.73*** 8.28	0.72*** 8.29	0.71*** 7.6	0.75*** 6.51	-0.05 -0.42
DVOL	-0.02 -0.31	-0.02 -0.31	-0.03 -0.33	-0.02 -0.17	-0.01 -0.12
RET_6	0.01 -0.09	0.01 -0.08	0.01 -0.45	0.01 -0.01	0.01 -0.33
RET_12	0.01*** 4.36	0.01*** 4.35	0.01*** 4.9	0.01*** 2.75	0.01 0.86
DIVYIELD	0.02 0.90	0.02 0.88	0.01 0.36	0.04 1.33	-0.03 -1.13
CAPX/SALE	-1.20*** -2.62	-1.19*** -2.59	-0.92* -1.64	-1.68*** -2.51	0.76 1.00
EBIT/SALE	2.02*** 3.42	2.01*** 3.41	1.38* 1.78	2.64*** 3.35	-1.26 -1.25
DAT	-0.01*** -3.01	-0.01*** -3.01	-0.01** -1.96	-0.01*** -2.71	0.01 0.95
GEODUM	0.11 1.37	0.09 0.83	0.05 0.45	0.08 0.79	-0.03 -0.22
INDDUM	-0.06 -0.84	-0.05 -0.69			
GEODUM*INDDUM		0.01 0.11			

Table 10 (Continued)

Panel B: 07/1981 – 06/1991, 120 Months

	1	2	3	4	5
Intercept	1.23 1.55	1.30 1.61	1.45* 1.77	0.67 0.78	0.78 1.54
BM	0.38*** 3.39	0.37*** 3.37	0.31** 2.33	0.47*** 3.70	-0.16 -1.17
SIZE	0.26*** 2.61	0.26*** 2.54	0.29*** 2.91	0.24** 2.02	0.05 0.56
PRICE	0.51*** 6.38	0.51*** 6.39	0.59*** 7.15	0.40*** 4.17	0.19** 2.34
DVOL	-0.12 -1.53	-0.12 -1.50	-0.13 -1.60	-0.10 -1.18	-0.03 -0.39
RET_6	-0.00 -0.18	-0.00 -0.17	-0.00 -0.40	-0.00 -0.54	0.00 0.23
RET_12	0.01*** 3.77	0.01*** 3.74	0.01*** 3.97	0.01*** 2.58	0.00 0.50
DIVYIELD	0.03 1.11	0.03 1.10	0.02 0.63	0.05* 1.63	-0.03 -1.29
CAPX/SALE	-1.73*** -3.19	-1.72*** -3.16	-1.25** -2.15	-2.44*** -3.09	1.19* 1.61
EBIT/SALE	2.18*** 3.16	2.20*** 3.18	1.46* 1.72	3.24*** 3.71	-1.77* -1.73
DAT	-0.01*** -3.31	-0.01*** -3.37	-0.01*** -2.80	-0.01*** -2.86	0.00 0.06
GEODUM	0.01 0.13	-0.12 -0.91	-0.15 -1.10	0.12 0.99	-0.27* -1.76
INDDUM	-0.21*** -2.70	-0.27*** -2.91			
GEODUM*INDDUM		0.24* 1.64			

Table 10 (Continued)

Panel C: 07/1991 – 06/2001, 120 Months

Regression	1	2	3	4	5
Intercept	1.65*	1.60*	1.35	1.68	-0.32
	1.72	1.67	1.39	1.46	-0.37
BM	0.26**	0.26**	0.26*	0.33*	-0.07
	1.96	1.97	1.68	1.88	-0.36
SIZE	0.07	0.08	0.05	0.12	-0.07
	0.45	0.48	0.32	0.60	-0.39
PRICE	0.94***	0.94***	0.82***	1.11***	-0.29
	6.12	6.14	4.94	5.37	-1.33
DVOL	0.07	0.07	0.08	0.07	0.01
	0.55	0.53	0.60	0.42	0.06
RET_6	0.00	0.00	-0.00	0.00	-0.00
	0.03	0.04	-0.26	0.43	-0.58
RET_12	0.01***	0.01***	0.01***	0.01	0.00
	2.54	2.54	3.09	1.51	0.70
DIVYIELD	0.01	0.01	-0.00	0.03	-0.03
	0.32	0.3	-0.00	0.58	-0.62
CAPX/SALE	-0.67	-0.65	-0.59	-0.91	0.32
	-0.91	-0.89	-0.61	-0.84	0.24
EBIT/SALE	1.85**	1.82*	1.30	2.05	-0.76
	1.93	1.90*	0.99	1.56	-0.43
DAT	-0.01	-0.01	-0.00	-0.01	0.01
	-1.46	-1.43	-0.46	-1.58	1.04
GEODUM	0.21*	0.29*	0.25	0.04	0.20
	1.66	1.84	1.41	0.26	0.88
INDDUM	0.10	0.17			
	0.90	1.38			
GEODUM*INDDUM		-0.21			
		-0.10			