This paper seeks to reconcile the common prescription that unrelated diversification does not pay, with the paradoxical evidence that it sometimes does. Using longitudinal data we explore the effect of diversification (related and unrelated) on performance, finding that it takes time for a diversification strategy to take effect.

Strategic management researchers have studied corporate diversification and its relationship to corporate performance for decades yet questions still remain. The prevailing wisdom in the literature describes modest levels of related diversification as leading to stronger performance (Palich, Cardinal, and Miller, 2000) with negative performance implications as firms increase diversification levels towards unrelated diversification (Rumelt, 1982; Bettis 1981). Based on this research, managers should eschew unrelated diversification in favour of related diversification opportunities.

However in stark contrast to this advice, there are shining examples of thriving firms that engage in significant unrelated diversification profitably. One of the most recognizable exemplars of unrelatedly diversified firms is General Electric (GE), which is at the same time a very strong performer. And GE is not alone. There are other examples of large firms that are both highly successful and highly diversified (Varadarajan and Ramanujam, 1987). The current diversification literature does not explain successful unrelated diversified firms and leaves us with some interesting questions. How can we explain the common prescription that unrelated diversification does not pay, with the paradoxical evidence that it sometimes does? Do firms adapt to related and unrelated diversification strategies at similar rates, or are some strategies more difficult to adopt?

This research investigates these questions by exploring the time it takes for firms to realize the benefits from diversification, as they adapt to the new structures, processes and internal coordination required of a diversified firm. Adopting a diversified corporate strategy is clearly a large organizational change and previous research has suggested that disruptive organizational changes can “reset the clock”, resulting in negative firm performance (Amburagey, Kelly and Barnett, 1993). In fact, some suggest that it might take up to 12 years to realize the fruits of a diversification initiative (Biggadike, 1979).

This research finds that relatedly diversified firms suffer short term depressed performance, before experiencing modest performance benefits in the long term. Curiously, unrelated diversifiers are found to have either no effect on firm performance, or a small short term positive effect. This finding adds considerable nuance to the diversification-performance debate, as it suggests that related diversification only provides improved performance relative to unrelated diversified firms, once firms have matured into their diversified strategy. This research further implies that it may not be reasonable to compare recently diversified firms to firms with greater diversification experience.

The paper will proceed in four sections. The first section will describe the state of the literature on diversification and its effects on firm performance. The next section, will build a series of hypotheses testing the effects of elapsed time since diversification on firm performance. The third section will detail the measures and methods used to test the hypotheses. Finally, results will be presented and discussed.
Literature Review

Diversification has been variably defined in the literature on diversification as heterogeneity of product or services, the number of industries in which a firm is active, and the extent of simultaneous operations in other businesses (Ramanujam and Varadarajan, 1989). However, these definitions, and many others like them, describe a static, cross-sectional phenomenon. Diversification, or diversifying, is anything but static and is perhaps better captured by Ramanujam and Varadarajan (1989:525) in their extensive review of the subject as: “entry of a firm or business unit into new lines of activity, either by processes of internal business development or acquisition, which entail changes in its administrative structure, systems, and other management processes”.

Components of Diversification

This latter definition indicates that diversification is a dynamic process by which firms extend their lines of business. Firms diversify along a particular direction that might be related to existing businesses or unrelated to existing businesses. Related efforts include providing new products and services for existing customers, finding new ways to satisfy customer needs, extending along core technologies, leveraging existing knowledge, or extending managerial competency (Ramanujam and Varadarajan, 1989; Miller, 2006; Tanriverdi and Venkatraman, 2005; Pehrsson, 2006). Firms can also choose to enter unrelated businesses that may have very little to do with their existing customers, products, technologies or managerial competences. Firms’ diversification strategies may further vary in the extent to which they diversify. Some firms may spread their business activity evenly across all of their lines of businesses, while others are focused on one or two dominant businesses, with small forays into other businesses (Raghunathan, 1985).

A final component of diversification is the mode by which diversification is achieved. Mode is important in our discussion because it pertains to the process by which diversification is achieved within the firm. It is commonly thought that unrelated diversifiers proceed through acquisition, and related diversifiers through internal development (Ramanujam and Varadarajan, 1989).

Change and Challenge

The definition of diversification above points to significant structural, administrative, and systematic changes that are required as a firm diversifies either along existing businesses or into entirely new ones. These changes can vary from a relatively simple product extension, to an extensive reorganization involving significant changes to an organization’s structure. In fact, research has shown that firms move from a functional structure to a multidivisional (or m-form) one as they add additional businesses (Ramanujam and Varadarajan, 1989; Chandler, 1962). M-form organizational forms are challenging to implement and operate, but have been found to perform better for large diversified firms (Hoskisson, 1987).

Diversification and Performance results

There is a strong tradition in the strategic management literature of testing the corporate diversification – performance linkage (Ramanujam and Varadarajan, 1989). Despite this, there is not universally accepted direction or extent of diversification that yields the strongest performance. The relationship depends on moderating factors, the direction of diversification and the extent of diversification.

What appears to be prevailing wisdom is that related diversification leads to stronger accounting performance than unrelated diversification (Palepu, 1985; Keats, 1990; Bettis, 1981). Yet unrelated diversifiers perform as strongly as related diversifiers and stronger than single business firms with respect to market measures of performance (Michel and Shaked, 1984; Keats, 1990). The relationship then is moderated by the choice of performance measure and the direction of diversification, being related or
unrelated. Market based performance measures are considered a leading indicator of performance, since it focuses on the value of future streams of revenue (Rowe and Morrow, 1999). These findings are suggestive of the long term firm performance impact of unrelated diversification that is not captured by previous or current accounting measures.

Other moderating factors include whether the firm is structured as a multidivisional (m-form) organization (Hoskisson, 1987), how the firm is centralized, integrated and incented (Hill, Hitt, and Hoskisson, 1992), and the characteristics of the market such as profitability and concentration (Christensen and Montgomery, 1981).

It is clear from the diversification literature that the relationship between diversification and performance is a curvilinear one. While increasing diversification from a single business to a relatedly diversified firm increases performance, continued diversification into unrelated diversification has a negative impact on accounting performance (Tallman and Li, 1996; Palich, Cardinal and Miller, 2001). Curiously, the little research there is, suggests that the mode of diversification, either internal development or external acquisition, has no impact on performance (Busija, O’Neill and Zeithaml, 1997).

Theory Development

The literature addressing the relationship between corporate diversification and performance is mixed. While the weight of evidence suggests that related diversified firms perform better than unrelated diversified firms, both anecdotal and empirical evidence suggest the relationship is not that simple. Varadarajan and Ramanujam (1987) found that there were high performing unrelated diversifiers and poorly performing related diversifiers in their study. Often studies examining phenomenon with such conflicting findings in the literature, look for moderators and/or mediators in order to capture a more nuanced model fit (Venkatraman, 1989).

This study instead investigates timing effects, suggesting that diversification strategies will affect firm performance differently, based on the duration since their initial diversification activities. By examining these effects, the study aims to assess whether it is appropriate to compare recently diversified firms, with firms that have been diversified for a longer period of time and have more fully adapted to that which entails a diversified firm. Or more generally, does the relationship between diversification strategy and performance change over time.

Diversifying is a challenging prospect. Firms often require changes to their organizational structure, significant development of internal capabilities and processes, and incur increased coordination challenges. As a result, increasing or changing diversification levels can be disruptive, significantly disturbing the organization (Amburgey, Kelly and Barnett, 1993). Each of these organizational changes can leave recently diversified firms disrupted and underperforming; taking time and effort to resolve.

Changing Organization Structure

Changing from a functional to an m-form organizational structure brings lots of challenges that take time and effort to address. For example, it is critical to find the appropriate employees to fill newly created positions. Further the formal chain of command structure and new incentive systems may require ongoing adjustments and tweaking and also take time to roll out and communicate to the broader organization. Finally, within any organization informal relationships are as important as formal ones to the running of an organization, and these informal ties take time to develop when entire departments and working groups change.
Internal capabilities and processes

In addition to structural concerns, a firm’s internal capabilities must be adjusted in order to address the newly diversified portfolio of products and services. For example, it takes time for shared facilities between existing and new lines of business to properly adapt and service both businesses effectively. It may take even longer for synergies between two lines of businesses to develop, even when they encompass related businesses.

This focus on internal capabilities, and challenges with increased coordination activities, can make it difficult for organizations to place sufficient attention on matters outside of the organization, challenging the firm’s response to external changes and likely negatively affecting firm performance (Chakrabarti, Singh and Mahmood, 2007). This danger is likely to be particularly acute immediately preceding the adoption of a diversification strategy, as the firm expends significant effort to effect internal change.

Coordination and Integration costs

Increased diversification has been shown to require increased coordination and integration costs (Chakrabarti, Singh and Mahmood, 2007). With the increase in scope, top management resources are spread more thinly since top management is responsible for monitoring greater business activity and resolving a greater number of problems. Even in the most relatedly diversified firms, there are conflicts between businesses as they compete for resources such as funds and employees.

In fact, research has suggested that there are limits to the levels of diversification firms can maintain (Chakrabarti, Singh and Mahmood, 2007; Markides, 1995). These limits are based on trading off the benefits of diversification such as increased revenues and new customers, with the coordination and integration costs associated with keeping the organization operating effectively. While this is no doubt true, these limits are likely not static. Newly diversified firms can invent organizational technologies such as control systems and divisions of labour that can increase the limits of diversification. It seems likely that firms that diversify beyond a temporary diversification “limit” suffer initially following diversification, but can develop capabilities over time that push that limit higher.

The effect of these early challenges associated with diversification, are likely to be different depending on whether the firm is engaging in related or unrelated diversification activities. Related diversifiers have proceeded by adding businesses that are related to their existing businesses either in terms of products, geographies, technological or operational capabilities, and/or customers. Further, their efforts are most likely accomplished through internal development, building from their base of support. As a result, it is likely that the disruption associated with diversification will be less severe. Further, recovering from the disruption will take less time because the synergies to be achieved are less obscure, and coordination between related businesses, less conflictual.

H1a: Newly diversified firms pursuing related diversification will experience less initial reduction in performance than unrelated diversifiers and will experience faster improvements in performance over time with respect to unrelated diversifiers. The effect will take the shape of a concave downward curve (see figure 1).
A similar effect is hypothesized for unrelated firms; a new organizational structure, evolving capabilities and increased coordination costs take time to resolve. With unrelated diversification this resolution may take even longer to work out. This is because there is less opportunity for people and systems in unrelated businesses to work together. This means that realizing synergies across the business will take longer, be they human resource management, financial portfolio management or specific technologies. Further, unrelated diversification is often accomplished through acquisition, which brings the additional challenges of integrating a new culture, employees, technologies and practices. This leads us to hypothesize that:

\( H1b: \) Newly diversified firms pursuing unrelated diversification will experience more initial reduction in performance than unrelated diversifiers, and will experience slower improvements in performance over time with respect to unrelated diversifiers. The effect will take the shape of a concave downward curve (see figure 1).

**Methodology**

**Data Sources**

All measures including performance, diversification data and financial metrics were drawn or calculated from Compustat tapes. The Russell 3000 was used as the sampling frame since it provides a broad coverage of firms; it comprises close to 98% of all publicly traded firms in the United States. Business segment and corporate data was pulled for the period from 1996 to 2006, with 1995 pulled in order to provide calculate lagged control measures.

Business segment data was available for 2700 of the 2980 firms in the Russell 3000 list. Business segments pertaining to intersegment eliminations or reported as having negative sales were removed. Firms were dropped that had inconsistent strategies over the duration of the study period, had less than three years worth of data, had gaps in the yearly data, or divested such that they moved from being characterized as a diversified firm to a single business one. While much of the data exhibited a consistent strategy over the entire study duration, some firms began as single business firms and then diversified into either related or unrelated directions. These firms offered an interesting opportunity study firms for the period of time following their diversification activity. In order to ensure that the data set contained firms exhibiting consistent strategies over the study period, years prior to the diversification activity was dropped.
This provided two data sets. The full dataset included firms that exhibited consistent diversified or single business corporate strategies throughout the study period or following their diversification move. A second data set that included firms that exhibited a consistent single business strategy throughout the study period, and those firms that diversified during the study period. The second data set provides a mechanism to isolate the effect of time on a newly diversified firm. These procedures left a cross-sectional time series data set with 1986 firms and an average of 7.96 years of data in the full dataset.

Variables

**Dependent Variable.** The dependent variable of interest is firm performance which is operationalized as return on assets (ROA). ROA was calculated from Compustat by dividing Net Income by Total Assets. In order to control for industry effects, the median ROA for the firm’s 2 digit SIC industry in which the firm is situated was subtracted from the firm’s ROA (Hoskisson, Hitt, Johnson and Moesel, 1993).

**Independent Variables.** Business segment level sales were used in order to calculate an entropy measure of diversification (Palepu, 1985). This measure has been found to have strong construct validity, in keeping with Rumelt’s categorization approach but providing a more fine grained, objective, and continuous measure of diversification (Hoskisson, Hitt, Johnson and Moesel, 1993).

Total diversification was calculated as the sum of the proportion of sales of each 4 digit SIC industry to the total sales of the firm times the natural logarithm of the inverse of the proportion of sales for a 4 digit SIC industry to total sales.

\[
Total\ Diversification = \sum P_i \ln(1/P_i)
\]

\[
Related\ Diversification = \sum P_j \sum P_{ij} \ln(1/P_{ij})
\]

\[
Unrelated\ Diversification = Total\ Diversification – Related\ Diversification
\]

The related diversification measure was calculated in two parts. The first or inner part of the measure was calculated by identifying the total diversification within a 2 digit SIC code or industry group (j in the equation below). The related diversification measure was then calculated as the sum of diversification measure for each industry group, weighted by the proportion of total sales represented by that 2 digit SIC industry group. Unrelated diversification was simply the difference between the total diversification and related diversification measures as calculated above. The unrelated and related diversification measures were then controlled for industry effects by subtracting the median industry unrelated and related diversification measures generated from 2 digit SIC codes from each score. The result provided related and unrelated diversification scores relative to industry diversification levels.

Employing the above scores, a 2x2 was constructed in order to identify 4 distinct diversification strategies. Firms that were above the industry average on related diversification and below the industry average on unrelated diversification, were categorized as related diversifiers. Similarly, firms with above industry average unrelated diversification and below industry average related diversification were unrelated diversifiers. Firms that had low related and low unrelated diversification were deemed to be operating the equivalent of single business operations. There were no instances of related linked diversifiers in the data set. Dummy variables were used to identify diversification strategies, with single businesses being the referent group.
Figure 2

Diversification Strategy Quadrant

<table>
<thead>
<tr>
<th>High Related Diversification</th>
<th>Low Related Diversification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related Linked Diversifier ((d_{\text{relatedlinked}}))</td>
<td>Unrelated Diversifier ((d_{\text{unrelated}}))</td>
</tr>
<tr>
<td>Related Diversifier ((d_{\text{related}}))</td>
<td>Single Business (referent group)</td>
</tr>
</tbody>
</table>

The above quadrants provide the diversification measure, we can address both the degree of diversification and the type of diversification to reflect a more complete range of diversification categories (Keats, 1990). This method was chosen in order to strike a balance between the soft interpretative character of Rumelt’s categorization (Montgomery, 1982), and the numerical approaches of an entropy or Herfindahl index measure (Palepu, 1985; Varadarajan and Ramanujam, 1987). Further, Rumelt’s classification system can take up to 30 minutes to classify a single firm (Lubatkin, Merchant and Srinivasan, 1993), which is inhibitive for large diversification studies. This measure is able to capture the curvilinear nature of diversification (Palich, Cardinal, and Miller, 2000).

Controls. All controls were adjusted for industry effects by subtracting the industry median from each firm’s score. Industry medians were derived from the two digit SIC code associated with the firm’s primary industry as identified in Compustat. This method of industry control has been used in diversification studies in the past (see Hoskisson, Johnson and Moesel, 1994). Further, all controls were lagged one year prior to the measurement of ROA.

The first control is firm size which has been shown to have a significant and positive impact on firm performance (Morrow, Sirmon, Hitt and Holcomb, 2007). Firm size was operationalized as the natural logarithms of firm employees. Assets and Sales were considered and rejected because assets was negatively related to ROA, and Sales were positively related to ROA providing conflicting evidence of the effect of firm size on firm performance. Another control employed is financial leverage which has been found to limit managerial discretion with respect to diversification. Higher financial leverage is associated with lower firm performance. Financial leverage is measured as the ratio of debt to equity. Slack resources have shown to be associated with higher financial performance with respect to diversification (Gary, 2005; Morrow, Sirmon, Hitt, and Holcomb, 2007). Slack resources were operationalized as working capital calculated as current assets divided by current liabilities representing an immediate proxy for cash on hand. Finally, prior financial performance was controlled for as ROA, lagged by a year. ROA, debt to equity and working capital were each winsorized due account for lack of normality. Values greater than the 99th percentile were adjusted downward to the 99th percentile, and values less than the 1st percentile were adjusted upward to the 1st percentile.

Data Analysis

In order to test the hypotheses, two approaches were employed. The nature of the data set employed in this study is such that it is assumed to exhibit autocorrelation between years of data and heteroskedastic error variances. Due to this, both analysis approaches employed generalized least squares regression (GLS) because it handles data that violates typical OLS regression assumptions regarding autocorrelation and heteroskedasticity within the data set (Bergh and Holbein, 1997). STAT’s \(xtgls\) command was used for this estimation.
The first approach seeks to estimate a panel longitudinal model, employing quadratic time covariates. In this analysis, yearid begins at 1 reflecting the year a firm joined the data set, and grows by one for each year of data. The variables with a “d_” suffix represent dummy variables associated with related and unrelated diversification strategies. In this model we are expecting to find negative coefficients for $\beta_6$ and $\beta_8$ representing a concave down effect, and positive $\beta_5$ and $\beta_7$ coefficients to match the expected curve hypothesized in figure 1. To further support the hypotheses, the coefficients associated with related diversification coefficients should be such that they demonstrate larger increases in performance than those of the unrelated diversified coefficients.

\[
Y = \alpha + \beta_1 \text{yearid} + \beta_2 \text{yearid}^2 + \beta_3 \text{d_related} + \beta_4 \text{d_related}^2 + \\
\beta_5 \text{d_unrelated} + \beta_6 \text{d_unrelated}^2 + \beta_7 \text{yearid*d_related} + \beta_8 \text{yearid}^2 \text{d_related} + \\
\beta_9 \text{yearid*d_unrelated} + \beta_{10} \text{yearid}^2 \text{d_unrelated} + \text{controls (financial leverage, working capital, previous ROA, size)} \quad (\text{Equation 1})
\]

The second method attempts to identify a similar pattern, but does so by estimating 3 separate regressions across three time periods; years 1-3, 4-7 and 8-11. In this model (see equation 2) we are expecting to find $\beta_3$, associated with relatedly diversified firms to be negative in the first time period to reflect an initial drop in performance, followed by subsequent rise such that relatedly diversified firms are showing strong performance in the final time period. Similar effects are expected for unrelated diversification, $\beta_3$, except that initial drop in performance should be significantly greater than that for related diversification and the time to recovery longer.

\[
Y = \alpha + \beta_1 \text{d_related} + \beta_2 \text{d_related}^2 + \beta_3 \text{d_unrelated} + \beta_4 \text{d_unrelated}^2 + \\
\text{controls (financial leverage, working capital, previous ROA, size)} \quad (\text{Equation 2})
\]

Each approach will be run for the entire data set and for the restricted dataset that isolates single business firms and those firms that adopted a diversification strategy during the study period. Recall that the entire dataset that includes firms that exhibited a consistent diversification strategy (related or unrelated), firms that exhibited a consistent single business strategy, and firms that adopted a diversification strategy

**Results**

Descriptive statistics including means, standard deviations, skewness, kurtosis and correlations are found in Table 1. Correlations among variables do not appear problematic with the possible exception of the very strong positive correlation between ROA and previous ROA, and the negative correlations between the single business dummy variable, and the diversification dummy variables; the latter making sense considering when each dummy variable is mutually exclusive. Previous ROA was controlled both in the GLS model, but also by including the previous year’s ROA as a covariate. Skewness and kurtosis was a serious issue for many of the measures in the study with many of the variables exhibiting extremely high scores. Table 1 shows the final skewness and kurtosis scores after applying a winsorization process, as well as the unadjusted values. While the winsorization significantly improved the normality of the measures, there is still potential that regressions may exhibit biased results.

In order to assess multicollinearity, three separate cross-sectional regressions were run on three years of data; years 1, 4 and 8. The resulting VIFs from the regression analysis are shown in table 2. All VIFs are well under 10, suggesting no multicollinearity issues (Paetzold, 1992).

Equation 1 was run on both the full and restricted data sets. Equation 1 was run using a cross sectional time series (panel) feasible generalized least squares regression. The regression model employed a heteroskedastic panel structure, and assumed first degree autocorrelation. Results are reported
in Table 3. Strong chi-squares of 9079.2 and 7897.45 respectively indicate a significant finding. However, the coefficients of interest were for the most part non-significant. Only yearid*DU and yearid²*DU were marginally significant but suggestive of a concave upward sloping curve as opposed to the curve in figure 1. These results would lead us to reject hypothesis 1a and 1b.

Equation 2 was also run on the same two sets of data, over three time periods. The first time period was for years 1 through 3, the second years 4 through 7 and the third years 8 through 11. The results, reported in tables 4 and 5, show a very interesting result. In both data sets, firms with related diversification exhibited negative performance in the first period and increasingly positive performance through the second and third periods in partial support of hypothesis 1a. This suggests that firms that relatedly diversify suffer a short term performance penalty that disappears over time. Comparing the two data sets, the pattern appears more pronounced in the regression examining recently diversified firms. While the general pattern of results is as hypothesized, the direction of the coefficients suggests a U shaped relationship. Conversely unrelated diversifiers do not appear to suffer performance penalties after diversifying and, in the full data set, exhibited short term increases in performance, before leveling out, more in keeping with hypothesis 1b.

Caution should be used in interpreting these regression results. Residuals were computed by calculating a predicted ROA, and subtracting it from the actual ROA from the dataset. In checking for model fit, residuals while possessing close to 0 mean, demonstrated high kurtosis and skewness and were correlated with many of the covariates used in the regression analysis.

Discussion

This study, while only partially supporting the hypotheses as written, provide some interesting findings with respect to the effect of time on diversification. Most importantly, this research suggests that when embarking upon related diversification, there are likely to be bumps along the road. Performance may suffer in the short and mid terms, and it may be as much as 8-11 years before related diversification efforts positively impact firm performance. This is in keeping with suggests by Biggadike (1979) suggesting that diversification moves may take up to 12 years to realize benefits.
### Table 1

**Means, Standard Deviations, Normality and Correlations**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurtosis</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ROA&lt;sup&gt;c&lt;/sup&gt;</td>
<td>-0.019</td>
<td>0.131</td>
<td>-3.341</td>
<td>20.913</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ROA (previous)&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>-0.024</td>
<td>0.146</td>
<td>-3.82</td>
<td>25.18</td>
<td>0.615</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Working Capital&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>0.128</td>
<td>0.288</td>
<td>0.512</td>
<td>2.166</td>
<td>-0.045</td>
<td>0.006</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Debt to equity&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>1.299</td>
<td>5.206</td>
<td>3.312</td>
<td>15.251</td>
<td>0.023</td>
<td>0.019</td>
<td>0.116</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Employees&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>-0.129</td>
<td>1.845</td>
<td>-0.124</td>
<td>3.137</td>
<td>0.226</td>
<td>0.253</td>
<td>-0.294</td>
<td>0.106</td>
<td>1.000</td>
<td></td>
<td></td>
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<tr>
<td>6</td>
<td>Related Dummy</td>
<td>0.112</td>
<td>0.315</td>
<td>-0.045</td>
<td>0.048</td>
<td>-0.115</td>
<td>0.063</td>
<td>0.227</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Unrelated Dummy</td>
<td>0.109</td>
<td>0.311</td>
<td>0.044</td>
<td>0.045</td>
<td>-0.085</td>
<td>0.047</td>
<td>0.144</td>
<td>-0.124</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Single Dummy</td>
<td>0.779</td>
<td>0.415</td>
<td>-0.067</td>
<td>-0.071</td>
<td>0.151</td>
<td>-0.083</td>
<td>-0.281</td>
<td>-0.667</td>
<td>-0.657</td>
<td>1.000</td>
<td></td>
</tr>
</tbody>
</table>

* a – variable is lagged one year;  
* b – variable has been transformed with the natural logarithm;  
* c – variable has been adjusted by a winsorization process. Only the adjusted means and standard deviations are shown.  
Correlations represent all years. Separate correlations were run for year 1, and while there were differences, the patterns were the same.

### Table 2

**Variance Inflation Factors**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 4</th>
<th>Year 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA (previous)&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>1.12</td>
<td>1.1</td>
<td>1.05</td>
</tr>
<tr>
<td>Working capital&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>1.15</td>
<td>1.14</td>
<td>1.17</td>
</tr>
<tr>
<td>Debt to equity&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>1.06</td>
<td>1.05</td>
<td>1.04</td>
</tr>
<tr>
<td># of employees&lt;sup&gt;a,c&lt;/sup&gt;</td>
<td>1.34</td>
<td>1.33</td>
<td>1.24</td>
</tr>
<tr>
<td>Related Dummy</td>
<td>1.15</td>
<td>1.11</td>
<td>1.09</td>
</tr>
<tr>
<td>Unrelated Dummy</td>
<td>1.09</td>
<td>1.07</td>
<td>1.04</td>
</tr>
<tr>
<td>Mean VIF</td>
<td>1.15</td>
<td>1.13</td>
<td>1.1</td>
</tr>
</tbody>
</table>

* a – variable is lagged one year;  
* b – variable has been transformed with the natural logarithm;  
* c – variable has been adjusted by a winsorization process.
Table 3

Regression Runs – ROA – Equation 1

<table>
<thead>
<tr>
<th></th>
<th>Full Dataset</th>
<th>Restricted Dataset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yearid</td>
<td>0</td>
<td>0.000</td>
</tr>
<tr>
<td>yearid^2</td>
<td>0</td>
<td>0.000</td>
</tr>
<tr>
<td>Yearid*DR</td>
<td>0</td>
<td>0.000</td>
</tr>
<tr>
<td>yearid^2*DR</td>
<td>0</td>
<td>0.000</td>
</tr>
<tr>
<td>Yearid*DU</td>
<td>-0.001</td>
<td>-0.002^1</td>
</tr>
<tr>
<td>yearid^2*DU</td>
<td>0</td>
<td>0.000^1</td>
</tr>
<tr>
<td>DR (Related dummy)</td>
<td>-0.002</td>
<td>-0.003</td>
</tr>
<tr>
<td>DU (Unrelated Dummy)</td>
<td>0.002</td>
<td>0.003</td>
</tr>
<tr>
<td>DR^2</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>DU^2</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Debt to equity^a,c</td>
<td>0</td>
<td>0.000</td>
</tr>
<tr>
<td>Working capital^a,c</td>
<td>-0.009***</td>
<td>-0.008***</td>
</tr>
<tr>
<td>ROA (previous)^a,c</td>
<td>0.53***</td>
<td>0.526***</td>
</tr>
<tr>
<td># of employees^a,c</td>
<td>0.002***</td>
<td>0.002***</td>
</tr>
<tr>
<td>Constant</td>
<td>0.001</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Chi Square           9079.2***  7897.450***
Observations         15804  14399
Firms                1986  1822
AR(1)                0.1944  0.2025

a – variable is lagged one year;
b – variable has been transformed with the natural logarithm;
c – variable has been adjusted by a winsorization process.
*** p<0.001, ^ p<0.10
NA – means that the variable was dropped due to collinearity
Table 4

Regression Runs – Equation 2 (full data set)

<table>
<thead>
<tr>
<th></th>
<th>1-3 years</th>
<th>4-7 years</th>
<th>8-11 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>d_Related</td>
<td>-0.003**</td>
<td>0.002**</td>
<td>0.004***</td>
</tr>
<tr>
<td>d_Unrelated</td>
<td>0.001*</td>
<td>0.002**</td>
<td>-0.002</td>
</tr>
<tr>
<td>Debt to equity</td>
<td>0.000***</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Working capital</td>
<td>-0.011***</td>
<td>-0.010***</td>
<td>-0.008***</td>
</tr>
<tr>
<td>ROA (previous)</td>
<td>0.465***</td>
<td>0.469***</td>
<td>0.512***</td>
</tr>
<tr>
<td># of employees</td>
<td>0.006***</td>
<td>0.003***</td>
<td>0.003***</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.003***</td>
<td>-0.004***</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Chi Square: 5330.44*** 6137.570*** 4640.030***
Observations: 4870 6241 4137
Firms: 1753 1659 1122
AR(1): 0.288 0.280 0.276

Table 5

Regression Runs – Equation 2 (restricted data set)

<table>
<thead>
<tr>
<th></th>
<th>1-3 years</th>
<th>4-7 years</th>
<th>8-11 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>d_Related</td>
<td>-0.007***</td>
<td>0.000</td>
<td>0.004‡</td>
</tr>
<tr>
<td>d_Unrelated</td>
<td>0.001</td>
<td>0.002</td>
<td>0.000</td>
</tr>
<tr>
<td>Debt to equity</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Working capital</td>
<td>-0.011***</td>
<td>-0.007***</td>
<td>-0.006***</td>
</tr>
<tr>
<td>ROA (previous)</td>
<td>0.475***</td>
<td>0.482***</td>
<td>0.498***</td>
</tr>
<tr>
<td># of employees</td>
<td>0.006***</td>
<td>0.003***</td>
<td>0.003***</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.003***</td>
<td>-0.004***</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Chi Square: 4279.47*** 3577.45*** 3530.530***
Observations: 4426 5732 3704
Firms: 1595 1519 1009
AR(1): 0.272 0.297 0.312

Of course, different firms will likely follow different paths and rates of adoption over time (Short, Ketchen, Bennet and du Toit, 2006). Of particular concern with respect to related diversification, is how the two related businesses are in fact related. Knowledge relatedness may be much easier to apply than physical plants and equipment, which could reduce the time the organization takes to adapt to the newly diversified firm (Miller, 2006).

A curious finding from the research is that unrelated diversification does not appear to negatively impact firm performance. This finding may be the result of unrelated diversified firms not seeking
synergies among the unrelated businesses. Unrelated diversified firms are typically managed like a portfolio of businesses and held to financial targets as opposed to strategic ones (Hill, Hit and Hoskisson, 1992). The lack of integration and coordination between unrelated businesses may dampen the negative effect that a diversification move has on a firm’s performance. It suggests that the initial negative performance implications associated with related diversification may result from the coordination and integration effort expended in appropriately fitting the new businesses into the existing organization.

Taken together, these findings provide some guidance to strategic management researchers. First off, researchers should be cautious in comparing diversified firms in a cross-sectional manner. Newly related diversified firms perform differently 4 or 8 years following a diversification move than they do immediately afterwards. This further suggests that firms should be very thoughtful in how they lag their diversification strategy variables in studies of diversification and performance. Perhaps lagging diversification strategy 2, 4, or more years before measuring performance will provide a more accurate reflection of the impact of a diversification strategy.

A comment on the difference between the models measuring the two equations is in order. Taken at face value they appear to provide contradictory evidence. There are a couple of reasons why this may be the case. The first is the use of year variables in a panel regression. We are not sure how the panel regression handles these variables, and whether their use is appropriate. The second is that the effect sizes identified are quite small. It is possible that given the small effect sizes provide an increased challenge in fitting the quadratic equation properly.

This study is not without limitations. The reliance on a single accounting measure of firm performance may disguise interesting relationships with market or growth measures of performance (Rowe and Morrow, 1999; Combs et al, 2005); especially considering research has found positive relationships between unrelated diversification and market performance (Michel and Shaked, 1984; Keats, 1990). The use of a year identifier (representing the duration the firm was in our study and/or adopting a consistent strategy) instead of the actual calendar year may complicate interpretation of the results. While the year identifier was used in order to capture the effects of a firm’s diversification strategy in the years following a diversification move, the resulting analyses end up directly comparing firms that were diversified at the start of the study period, with those that were diversified in the middle of the study period. Future research could attempt a matched pair analysis between single business firms and corresponding related and unrelated diversifiers. Tracking firm performance up to and following adopting a diversification strategy. Finally, future research may benefit from explicitly breaking out diversification through internal development and that through acquisition to account for the varying challenges associated with these modes of diversification over time.

**Conclusion**

Strategic management researchers have expended significant effort investigating the diversification to performance relationship and have made significant strides. However, an over reliance on cross-sectional methods in studying the phenomenon, may have led to erroneous conclusions. This research provides evidence to suggest that following a strategic diversification change, firm performance takes time to stabilize as the organization adapts to a new organizational structure and integration challenges. Comparing firms without consideration of the duration since the firm initially diversified can result in a skewed understanding of the diversification to performance relationship. This study further suggests that firms should be cautious about engaging in even related diversification, especially if they are in a precarious financial position. Related diversification can lead to depressed short term performance that may challenge unprepared firms. Our research contributes to a better understanding of the effects of time on the diversification performance relationship, and renews calls for increased panel and longitudinal research into the area.
References


