Relatedness and Performance: A Reexamination of the Diversification-Performance Link

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Empirical studies of firm diversification suggest the existence of a positive relationship between the relatedness of diversification and firm performance. Using evidence from the food manufacturing sector, we find that this relationship is weak at best and that market share appears to be a more powerful predictor of firm performance.

Many manufacturing industries went through significant corporate restructuring during the 1980s. Because of their potential impact on industry/firm structure and performance, many studies have examined why these restructuring activities occurred and what objectives firms attempted to achieve through restructuring. Although a wide range of findings and explanations have been offered by empirical studies of restructuring and diversification, an emerging consensus within the strategic management literature is that firm performance is positively correlated with related diversification and negatively correlated with unrelated diversification [Ravenscraft and Scherer, 1987; Porter, 1987; Shleifer and Vishny, 1990]. The key difference between corporate restructuring in the 1980s and that attendant to the 1960s merger wave is said to be in its effect on firm diversification or the degree of relatedness between the acquiring and acquired firms' lines of business [Shleifer and Vishny 1990]. While the earlier wave was more conglomerate in nature with firms making large numbers of acquisitions in lines of business not closely related and, in some cases, totally unrelated to their core lines, restructuring in the later wave is believed to be associated with firms selling off unrelated and acquiring more closely related business lines. In fact, the later wave appears to be largely concerned with undoing the results of the previous one [Porter 1987]. Based on this argument, corporate restructuring in the 1980s

would be expected to have produced higher related and lower unrelated diversification. However, recent evidence from the food manufacturing sector raises questions about the validity of such relationships and their applicability to individual industries. This study contributes to this area by reexamining the diversification-performance link in an industry-specific framework. In addition to focusing on the diversification-performance relationship, we also examine other factors as explanations for the latest wave of corporate restructuring. In particular, we test whether it is the firm's competitive position, not relatedness of diversification, that has a direct impact on firm performance.

Diversification Theory and Empirical Studies

Strategic management and industrial organization researchers have employed varied definitions of diversification. In a comprehensive survey of diversification studies, Ramanujam and Varadarajan [1989] found at least five commonly used definitions. In the most general sense, a diversified firm is one that produces a number of different products and services [Needham 1978]. Diversification can be classified as related or unrelated. According to Salter and Weinhold [1979], diversification is considered related if it involves businesses that 1) serve similar markets or use similar distribution systems, 2) employ similar production technologies, 3) exploit similar science-based research, or 4) operate at different stages of the same commercial chain. Unrelated diversification involves business lines that do not share any of these characteristics.

Like other features of firms' behavior, diversification is the outcome of attempts to achieve certain objectives subject to a number of constraints. Diversification may be undertaken to ex-

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ploit efficiency or market power opportunities, or because further expansion in the firm's current markets is blocked by antitrust policy. Except perhaps in the latter case, the degree of diversification is a conscious strategic decision that should have a positive impact on firm profitability. The devotion of corporate management to profit maximization has been severely questioned, however, based on the performance of conglomerates in the 1970s and 1980s. Most prominently, Jensen [e.g., 1989] argues that the public corporation is going into eclipse because it provides inadequate discipline to corporate management to forgo pursuing unprofitable opportunities and disperse excess cash to stockholders. Further, corporate managers may, from time to time, simply make mistakes in formulating diversification strategy [Porter 1987].

Diversification theory and empirical work largely explore the relationship between diversification strategy and firm financial performance, with major studies in the areas of industrial organization and strategic management [Palepu 1985]. Early industrial organization research, including the pioneering studies published by Gort [1962], Arnould [1969], and Markham [1973], found no significant positive relationship between diversification and firm performance. Later studies focused on other motives for corporate diversification, such as entry into new markets or avoidance of antitrust challenges. In the last 15 years, most diversification-performance research has occurred in the strategic management literature. In a landmark study Rumelt [1974] concluded that studies examining the relationship between firm performance and the general level of diversification had been misdirected. Instead he argued diversification-performance studies should focus on the relatedness of diversification and its performance impact. Using a categorical diversification scheme, he found a positive relationship between firm performance and related diversification. Since then studies by Montgomery [1979], Christensen and Montgomery [1981], Rumelt [1982], and Palepu [1985] have confirmed the observation that firms that are diversified into related businesses were usually more profitable than other firms. Based on this line of argument, firms would be expected to choose to increase related and reduce unrelated diversification and this trend should have been reflected in corporate restructuring of the 1980s.

However, evidence from the food manufacturing sector appears to contradict this expectation. In a study of the diversification patterns and restructuring histories of 83 large food manufacturing firms, Ding [1992] found both related and unrelated diversifications increased between 1981 and 1989. In restructuring, sample firms appeared to be much more concerned about competitive positions than the relatedness of diversification. This study reexamines the diversification-performance relationship based on a sample of large food/tobacco firms.

Model Specification

Among empirical studies of structure-performance relationships, there are two major groups in terms of the unit of analysis. The majority use industry-level data, with the rest using firm level data [Martin, 1988]. There are two reasons for this difference in approach. First, traditional industrial organization theory focused on collective industry performance, which determines the quality of resource allocation in the economy, and naturally took the industry as the unit of analysis [Porter, 1981]. A secondary reason for an industry focus was data were easily available in published reports and documents such as the Census of Manufactures. In the last 20 years, however, work in industrial organization has shifted the unit of analysis to both the firm and the industry, as more researchers began to examine firm-level performance. This study follows the newer tradition and uses firm-level diversification and performance data.

A wide variety of statistical models have been employed in industrial organization and strategy research to estimate the relationship between firm structure and performance [Bettis, 1981; Bettis and Mahajan, 1985; Montgomery, 1985; Palepu, 1985; Rumelt, 1982; Ravenscraft and Scherer, 1987]. A modified single-equation, multivariate Montgomery-type model takes the following general form (see Appendix for mathematical formulas used to calculate equation variables):

$$PERF = \beta_o + \beta_1 DR^*_{20/21} + \beta_2 DU + \beta_3 4RMKS + \beta_4 CR4 + \beta_5 GWR$$

where,

PERF = firm performance measured by return on invested capital (ROIC) and changes in stock price plus dividends paid (PDIV)

$DR^*_{20/21}$ = related diversification

DU   = unrelated diversification

RMKS = weighted relative market share

CR4   = weighted four-firm concentration ratio

GWR   = sales growth rate.

Performance (PERF)

Performance studies have generally accepted a single measure of performance. Most industrial organization economists have used price-cost margin to measure performance, while strategy researchers tend to use profitability measures (either accounting-based or market-based) to determine financial performance. Most of these measures rely on the neoclassical assumption of profit maximization. Most conventional measures of performance are based on maximizing stockholders' wealth. Two alternative performance measures are used in the model, changes in stock price plus dividends paid (PDIV), return on invested capital (ROIC). Following Luffman and Reed [1984], changes in stock price plus dividends paid (PDIV) is also used to gauge firm performance from the shareholder's point of view. Although accounting-based profitability measures have been widely used in performance studies, economists are acutely aware of the problems associated with using these data. Some of these problems are related to the choice of accounting methods, others are generally associated with the use of accounting data [Connolly and Schwartz, 1985; Ravenscraft and Scherer, 1987]. Despite their weaknesses, accounting based performance measures still provide a generally acceptable picture of firm performance [Schmalensee, 1989]. In this study, return on invested capital (ROIC) is used to measure the impact of diversification and other variables on the firm's overall profitability. This variable measures the efficiency with which the firm generates profits for a given bundle of capital.

Related and Unrelated Diversification ($DR^*_{20/21}$ and DU)

Early industrial organization studies investigated the impact of total diversification on firm performance. The results of these studies were in-

conclusive [Gort, 1962; Markham, 1973]. In recent years, new studies began to attempt to separate the effects of related and unrelated diversification on performance [Rumelt, 1974; Montgomery, 1979, 1985; Chatterjee, 1991]. Using large cross-sectional samples, these studies found a positive relationship between related diversification and firm performance due to synergy, scale economies in production and marketing, or market power. Unrelated diversification was found to have a strong negative impact on performance because managers of conglomerate firms could not manage anything and everything well; the costs of managing a diverse portfolio of business lines soon outweighed the realizable gains [Ravenscraft and Scherer, 1987]. For this study, related diversification is expected to have a positive and unrelated diversification a negative impact on performance.

Weighted Relative Market Share (RMKS)

For many years industrial organization economists used market concentration measures to describe the degree of market power. In recent years, however, studies have used market share as a measure of market power [*e.g.*, Shepherd, 1972, 1990]. The traditional absolute market share measure works well in describing the firm's competitive position relative to the served market as a whole. But it does not take into account differences in market structure and their impact on the firm's competitive position relative to those of its competitors [Buzzell and Gale, 1987; Cotterill and Iton, 1991]. For example, a given market share, say 15%, may represent substantial strength in a fragmented market but not so in a highly concentrated one. Relative market share measures contrast a firm's absolute share to the structure of the market in order to provide a more accurate description of the firm's true competitive position. In this study, a relative market measure is constructed by dividing absolute market share by CR4, the four-firm concentration ratio.

Weighted Four-firm Concentration Ratio (CR4)

Industry concentration measures have been widely used in empirical studies of structure and performance to measure the impact of market power. The intense interest in concentration by academics and policy makers alike results from the belief that industry concentration is a proxy for the

level of market power. The Structure-Conduct-Performance paradigm of industrial organization predicts a positive relationship between industry concentration and firm profitability. Highly concentrated industries are said to be more conducive to collusion and the exercise of market power, which lead to supranormal profits and misallocation of resources [Scherer and Ross, 1990; Cubbin, 1988]. More recently, the concentration-profitability relationship has been challenged in two fronts. First, the Chicago School economists have long argued that high profits in concentrated industries may result from superior efficiency instead of market power, and that the observed high profits in concentrated industries are due to lower costs, not artificially elevated prices [Demsetz, 1973]. Even within the Structure-Conduct-Performance school, new evidence has been put forward suggesting that industry concentration captures a false structure-performance relationship. The true underlying relationship may be between market share and performance [Shepherd, 1972, 1990]. Empirical evidence shows that the concentration-performance relationship is weak at best [Lamm, 1981; Montgomery, 1982] and once the share variable is incorporated, concentration loses its predictive power. Despite the controversies, both measures continue to be used in structure-performance studies [Marion and Kim, 1991].

Sales Growth Rate (GWR)

Both theory and some empirical studies have shown a close positive association between sales growth rate and profit [Eatwell, 1971]. The stock market in particular tends to reward firms with promising growth potentials. On the other hand, sales growth requires expansions of capacity and adequate capital to finance that expansion and studies of agency problems suggest that the pursuit of sales maximization by corporate managers often comes at the expense of shareholder wealth maximization and therefore has a negative impact on firm profitability [Fama, 1983; Jensen, 1989]. Because of these opposing arguments and conflicting evidence, the sign of this variable is uncertain.

Sample and Data Sources

Sample firms' financial data were obtained from the Compustat Industrial Annual Files. Compustat consists of a computerized data base of fi-

nancial, statistical, and market information on over 7,100 industrial and nonindustrial companies whose stocks are listed on the New York, American, NASDAQ, Regional, and Canadian Stock Exchanges. The Industrial Annual Files contain a total of 42 food manufacturing companies. Of these 42 firms, 35 have adequate information for performance analysis and are included in the sample. Measures of diversification were constructed based on information obtained from the Trinet Historical Files. The Trinet data report annual sales at the plant level. For this study, establishment sales were aggregated to arrive at total company sales and subtotals for each 4-digit segment and 2-digit group within each company. The model combines the entropy diversification indexes built from the Trinet database with firm-level financial information from the Compustat Annual Files.[1] The purpose is to test whether the degree and relatedness of diversification is linked to firm performance as other studies have suggested.

Model Estimation and Testing

Due to the relatively small sample size, an attempt was made to increase the degrees of freedom by combining the 1981 and 1989 data. A Chow test to determine whether the two samples could be pooled supported pooling. The regression results presented in Table 1 are based on the combined sample. The first equation uses changes in stock price plus dividends (PDIV) as the dependent variable and the second equation uses return on invested capital (ROIC) as the dependent variable.[2]

In the first equation, $DR^*_{20/21}$ has a positive sign and is significant at the 5% level. DU has an unexpected positive sign but is not significant. CR4 takes on an unexpected negative sign but is not significant. Relative market share has the expected positive impact on firm performance and is significant at the 1% level. Growth has an unexpected negative impact on firm performance although it is not significant. The positive and significant impact of related diversification on firm performance is expected and consistent with the findings of several other diversification-performance studies [Rumelt, 1979; Montgomery, 1979, 1985; Palepu, 1985],

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[1] A complete list of sample firms is available from the authors.

[2] Both performance measures were also regressed on various combinations of the independent variables. Results were consistent with those presented here.

Table 1. Regression Results

Dependent Variable	Intercept	DR*$_{20/21}$	DU	CR4	RMKS	GWR	R^2
PDIV	-63.684	62.551**	38.179	-0.151	4.419*	-264.330	0.400
		(1.98)	(1.22)	(-1.56)	(3.73)	(-1.27)	
ROIC	0.172	-0.009	0.007	-0.001	0.001**	-0.178***	0.205
		(-0.61)	(0.46)	(-1.22)	(2.26)	(-1.83)	

*   Significant at the 1% level
**   Significant at the 5% level
***   Significant at the 10% level
Numbers in parentheses are t-ratios

suggesting that related diversification is highly rewarded by the stock market. Contrary to what has been suggested by empirical studies of diversification, unrelated diversification does not appear to affect the stock market evaluation of the firm in any significant way. The fact that concentration is insignificant is not unexpected especially where the market share variable is highly significant. It appears that the performance effect both measures are designed to capture, is accounted for by the market share variable. This result is also in agreement with other empirical studies of diversification [Shepherd, 1972; Montgomery, 1985].

The second equation presents results of the model using ROIC as the dependent variable. Only two of the eight variables have significant impacts on firm profitability. Neither diversification measure has a significant impact on firm profitability, while relative market share has the expected positive sign and is significant at the 5% level. Growth has a significant negative impact on firm profitability. CR4 has an unexpected negative sign although it is not significant. There appear to be significant gains associated with relative market share as reflected by the positive and significant relationship between market share and profitability. These regression results provide further support for the proposition that the pursuit of stronger market positions rather than, or in addition to, the pursuit of related diversification may be the goal of corporate restructuring. The negative impact of growth on firm profitability is consistent with the argument that misdirected growth maximization may come at the expense of profitability.

At best these results provide only partial and tentative support for the diversification-

performance hypothesis. Most of the significant relationships emerge from the first equation in which firm performance was measured by stock market valuation. Even there, however, only qualified support is found for the diversification-performance hypothesis. Unrelated diversification is positively correlated with firm performance although it is not significant. This contradicts the conventional wisdom which predicts a strong negative relationship. The diversification-ROIC relationship is very weak. Neither diversification measures were found to be significantly correlated with firm profitability. The weak diversification-profitability relationship is hardly surprising because, as demonstrated in case studies in Ding [1992], profitability was not closely linked to firm structure during a volatile period of corporate restructurings.

Conclusions

Since Rumelt's landmark (1974) study, much research has been devoted to investigating the relationship between diversification and performance using firm-level data. The general consensus that emerged from this body of research is that firm performance appears to be positively correlated with the relatedness of diversification. This hypothesis was tested in this study using a sample of large food manufacturing firms. Two performance measures were used. The conventional return on invested capital (ROIC) was used to measure firm performance in terms of the efficiency with which it generates profits for a given bundle of capital. Change in stock price plus dividends paid (PDIV) was used to measure firm performance in the eyes of the stockholders.

The regression results do not lend strong support to the diversification-performance relationship suggested by other diversification-performance studies. Although related diversification is found to be positively related to stock market evaluation of firm performance, unrelated diversification failed to show a significant negative impact on this measure firm performance. This may have to do with the fact that the SIC-based diversification measures may not effectively separate the effects of related from unrelated diversification. When performance is measured by profitability (ROIC), the relationship between performance and the diversification measures is very weak, directly contradicting the diversification-performance hypothesis. One variable that consistently has positive impacts on firm performance is the firm's relative market share. Stronger market positions as measured by market shares are positively correlated with both performance measures. This finding provides support for the proposition that sample firms' preference for lines with strong market positions is rational.

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Appendix. Mathematical Formulas Used to Calculate Model Variables

1) Changes in stock price plus dividends paid:

$$PDIV_{1981, 1989} = \sum_{n}^{n+2} \frac{\Delta \text{ in common stock price } + \text{ dividends paid}}{3}$$

where,

$$n = 1979, 1987.$$

2) Related diversification index:

$$DR^*_{20/21} = DR_{20/21} \bullet P^{20/21}$$

where,

$$DR_j = \sum_{i \in j} P_i^j \bullet Ln\left(1 / P_i^j\right)$$

$$DR_{20/21} = \sum_{i \in 20/21} P_i^{20/21} \bullet Ln\left(1 / P_i^{20/21}\right)$$

P_i^j = *the share of the ith four-digit industry of the jth major group in the total sales of the major group.*

3) Return on invested capital:

$$ROIC_{1981, 1989} = \frac{\sum_{n}^{n+2} \frac{\text{Net income after tax } + \text{ Interest}}{\text{shareholders equity } + \text{ long-term debt}}}{3}$$

where,

$$n = 1979, 1987.$$

4) Unrelated diversification index:

$$DU = \sum_{j=1}^{M} P^j \bullet Ln\left(1 / P^j\right)$$

5) Weighted relative market share:

$$RMKS^k_{1981, 1989} = \frac{\sum_i PI_{ki} \bullet PF_{ki}}{CR} 4_i$$

where,

PI_{ki} = *the share of firm k's sales in four digit industry i.*
PF_{ki} = *firm k's sales in four digit industry i as a percentage of total firm sales.*
$CR4_i$ = *four-firm concentration ration in four digit industry i.*

6) Weighted four-firm concentration ratio:

$$CR4^k_{1981, 1989} = \sum_i CR4_i \bullet PF_{ki}$$

where,

$CR4_i$ = *four-firm concentration ratio in four digit industry i.*
PF_{ki} = *firm k's sales in four digit industry i as a percentage of total firm sales.*

7) Sales growth rate:

$$GWR_{1981, 1989} = \sum_{n}^{n+2} \frac{(\text{Total sales}_n - \text{total sales}_{n-1}) / \text{total sales}_{n-1}}{3}$$

where,

$$n = 1979, 19$$