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Profitability and Curvilinearity:
A Study of Product and International Diversification

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ABSTRACT

The study of diversification and firm performance lies at the heart of the strategy literature (Dess, Gupta, Hennart, & Hill, 1995). Nevertheless, in spite of all the efforts of researchers to untangle the diversification-performance relationship milieu, there is still much confusion surrounding this vital issue. One potential source of confusion centers on the type of diversification being pursued. It has often been assumed that diversification is a one-dimensional construct that exists along a single continuum. In addition, diversification-performance is usually tested under the hypothesis of linearity. Separating diversification into two major types, product and international (market), the present study employs an international sample (U.S., Japan, and EEC firms) in assessing the impact of diversification on firm performance.

INTRODUCTION

Diversification has been and continues to be a subject area that receives a large amount of attention (Delios & Beamish, 1999; Dess, Gupta, Hennart, & Hill, 1995; Geringer, Tallman, & Olsen, 2000). Despite all of the research studies on the topic, diversification still remains a largely misunderstood concept. The area that has received the bulk of the attention is the relationship between diversification and firm performance. Exactly what does diversification entail? What types of diversification result in the highest performance? Linking performance and strategy has taken on an additional level of complexity since the establishment of the North American Free Trade Agreement (NAFTA) and the development of the European Economic Community (EEC). In fact, the overall development of the globalized arena of business has complicated the diversification landscape even further. It is in light of these recent developments that the present study has been undertaken. In an attempt to integrate these two major topics, diversification and globalization, a study will be presented that focuses on understanding the diversification-performance linkage within an international context.

First, the study will adopt an international perspective with regards to diversification by making use of cross cultural sample that includes firms from the United States, Japan, and the EEC. It is argued that past research has focused almost exclusively on U.S. firms. Given the globalization efforts currently under way by most major business organizations, such a U.S.-based assumption is no longer a valid assumption. A collective sample of firms across the U.S., Japan, and EEC will serve as the basis for the study.

Second, two different aspects of corporate diversification will be analyzed; namely, product diversification and international diversification. Given the nature and degree of internationalization of the business community, incorporating both measures will offer a more complete picture of the effects of diversification on performance.

THE DIVERSIFICATION-PERFORMANCE LINKAGE

In order to recognize higher profits it is normally recommended that attempts at diversification should target areas that reinforce the firm's existing strengths or creates a foundation for developing new competitive advantages. Synergistic effects made possible through related diversification are often cited as the catalysts for the observed increase in performance. Due to the unavailability of synergy associated with unrelated diversification it is not expected that superior profits will not ensue under conditions which do not offer inter-business similarities.

However, since the development of the international mindset has taken root within the business world, two major schools of thought have permeated the strategy literature; namely, product diversification and international diversification. From a product diversification perspective, multinational firms can adopt a strategy that seeks to develop or purchase a new product. Firms pursuing such a product-based strategy is seeking to increase profits by adding additional products and thereby, expanding their current product line. The addition of a new product reflects a firm's desire to develop new markets or enter markets that are currently not in their business portfolio. Thereby, a firm is able to gain access to a new industry or market. Following a product diversification strategy may proceed along related or unrelated lines. However, the main result of such a strategy is that the firm has expanded its breadth of products across industry boundaries (i.e. the firm is now engaging in business in more industries than previously).

On the other hand, adopting a multinational diversification strategy leads a firm to enter foreign markets with existing products. Under this scenario a firm expands it businesses across international boundaries (multinational) by introducing an existing product or product line in a new country, hence the title international diversification. Since the focus of the international diversification strategy is on marketing existing products in new markets it can all be referred to as a market-based diversification strategy. To put it more succinctly, product diversification refers to the deployment of resources across new lines of business or industries, while multinational or market-based diversification refers to resource deployment across different countries, but within the same industries or lines of business (Grant et al., 1988). Although firms may pursue both product- and market-based diversification strategies simultaneously, it is argued that firms will reflect a predisposition toward one of these two diversification strategies. Thus, firms will gravitate toward one of the two diversification strategies.

PRODUCT-BASED DIVERSIFICATION

Despite the vast amount of attention that diversification has garnered in the past (Bettis, 1981; Dess, et al., 1995; Palepu, 1985; Rumelt, 1974, 1982), the controversy has resurfaced in recent years (Chatterjee and Blocher, 1992; Delios & Beamish, 1999; Dess, et al., 1995; Hall & St. John, 1994). One of the few conclusions that can and has been accepted by management scholars is that related diversification tends to outperform unrelated diversification (Amit & Livnat, 1988; Grant, Jammine & Thomas, 1988; Lubatkin & Rogers, 1989; Varadarajan & Ramanujam, 1987). It can also be concluded that the majority of research studies that confirm such a relationship have adopted a product diversification perspective.

The product-based view of diversification has been operationalized by utilizing weighted product count measures such as the Herfindahl and entropy indexes (Palepu, 1985). The main focus of these indexes is on the number of different SIC codes in which a firm does business. The general line of reasoning is that firms that are engaged in businesses across SIC codes are more unrelated or diversified than firms that conduct business within SIC codes. Therefore, the SIC system is assumed to reflect different product classifications across the SIC codes, with each code representing a different product area. Hence, the reason for referring to diversification utilizing SIC codes as product-based diversification. What is being measured is the amount or number of different and distinct product groups a firm has in its portfolio.

Using product-based measures of diversification as a proxy for diversification, results suggest that there are systematic differences between related and unrelated diversified firms. Superior profitability by related diversifiers is usually explained by the theory that engaging in businesses that are somehow related allows firms the opportunity to share resources among different but related businesses (Rumelt, 1974, 19820. The exploitation of relatedness, it is argued, may lead to "synergies" that allow firms to become more efficient. It is expected that such efficiencies will result in higher levels of firm performance. However, when a firm enters new product markets that are not related to its existing product line, or not as closely related to its core businesses, then it is argued that there is a lack of synergistic opportunities for exploiting potential sharing. Since the new product is not closely related with existing products the firm is unable to transfer its previous experience and expertise to the new product area. Instead, the firm must undertake additional costs, time and effort to learn about the new product. Such learning may be quite costly to acquire and at the very least difficult to spread over unrelated product lines.

The growth pattern accepted by most diversification experts suggests that firms will pursue related diversification until the domestic market has been saturated. After the majority of opportunities for related diversification have been exploited within a domestic market the firm will either have to undertake unrelated diversification within the domestic market or seek international diversification opportunities if it wishes to continue its growth and expansion. One avenue for growth that has become increasingly popular in recent years is for a firm to take their expertise within existing product lines and introduce them in new international markets. Research supports the contention that firms are increasingly seeking out new markets outside their domestic boundaries (Delios & Beamish, 1999; Geringer, et al., 2000). With this increased interest in opportunities abroad, firms are recognizing the benefits of internationalizing their corporate strategies.

By employing an international diversification strategy a firm can extend their relatedness strategy by entering new, but similar markets in other countries. Such familiarity breeds confidence and reduces the firm's exposure to risk, which is frequently a major concern of firms entering foreign markets. In addition to the reduction in risk associated with product familiarity the firm will recognize a reduction in risk inherent with developing new products for new markets, not to mention being able to avoid expenses associated with R&D and marketing. The market-based strategy will have the net effect of reducing risk and increasing profits, a combination that is hard to resist.

The establishment of a globalized economy (Gary, 1989) has been gaining ground within the business community as trade barriers continue to be eliminated (e.g., NAFTA, EEC). Associated with this continued exploration and penetration of international markets comes an opportunity to develop a more comprehensive view of strategy (Delios & Beamish, 1999; Geringer et al., 2000; Hitt, Hoskission, & Kim, 1997), one that goes beyond the traditional product-based view. Therefore, the international dimension or multinational component that we call market-based diversification (Eun & Resnick, 1994; Geringer, Beamish & daCosta., 1989; Porter 1990) represents a new dimension of the construct of diversification. In support of the importance of multination diversification Porter (1990) argues that a competitive advantage can also be developed or exploited using a global approach to strategy.

In fact, Porter (1990, 1991) goes even further and argues that global diversification may now lie at the heart of a company's performance. Multinational diversification has also been shown to be helpful in stabilizing the profit/risk relationship (Heston & Rouwenhorst, 1994; Kim et al., 1989). In light of all of the changes that have and are continuing to occur within the global markets it is becoming increasingly important to understand how firm performance is affected by multinational diversification. By separating diversification into market- and product-based components will provide a richer investigation of the diversification construct. However, despite its apparent relevance and importance to global diversification, the attention paid to multinational diversification has been rather meager (Delios & Beamish, 1999; Geringer et al., 1989; Geringer et al., 2000; Kim et al., 1989).

HYPOTHESES

Based on prior research studies, the general conclusion is that firms that diversify along related lines will outperform firms that employ an unrelated diversification strategy. Since product-based diversification is a unidimensional index of relatedness, the conclusion is that the more extensive a firm's product diversification, the more unrelated the diversification. Hence, a negative relationship between product diversification and performance would be expected given the extant research (Rumelt, 1974; Hall & St. John, 1994).

H_1: Firms with higher levels of product-based diversification will subsequently generate lower levels of firm performance.

Multinational diversification represents the opportunity for a firm to extrapolate and exploit previously master skills and capabilities by transferring them to foreign markets. Although the markets may be new to the firm the products and distinctive competences are well known. Such familiarities allow firms to confidently transfer well-developed and proven methods of production and marketing to new markets. Although the market-based diversification has received some attention, it still remains a relatively new construct within the field of strategy. Results from a

limited number of research studies suggest that market-based diversification will have a positive effect on firm performance, due to the benefits derived from economies of scope and scale, and the potential for exploitation of international market imperfections (Geringer et al., 1989; Grant et al., 1988; Kim et al., 1989).

H_2: Firms with higher levels of market-based diversification will subsequently generate higher levels of firm performance.

The exact relationship between diversification and performance has usually been assumed to be linear. However, the likelihood of a curvilinear relationship between performance and diversification is very likely. A curvilinear relationship suggests that there is an optimal level of diversification which will maximize profits and that either too little or too much diversification will result in inferior performance. Past research has suggested that a non-linear relationship between market-based diversification and performance may suffer from the same principle of optimality (Geringer, et al., 2000, Geringer et al., 1989; Hitt et al., 1997).

H_3: Product-based diversification will exhibit a curvilinear relationship with firm performance.

H_4: Market-based diversification will exhibit a curvilinear relationship with firm performance.

METHODOLOGY

Sample

The final sample for the study included a total of 186 firms across three country/economic areas, the U.S., Japan, and the EEC. A breakdown of the firms included in the sample is as follows: 89 U.S. firms, 50 Japanese firms, and 47 EEC firms. All financial data were obtained from *Compact Disclosure* (U.S. firms), *Worldscope* (Japanese and EEC firms) and *The Directory of Multinationals* (Stockton Press). A simple five-year average (1997-2001) was used for all of the variables used in the study. It is argued that a five-year average represents a more dynamic perspective of the diversification/performance relationship. In order to more accurately reflect a firm's "real" level of diversification and to allow time for the effects of diversification moves to be incorporated into the financial statements it was believed that a five-year average is a better measure of the variables being studied. Since firms have the opportunity to adjust their overall strategy over time a longer timeframe was adopted to allow the effects of strategic changes to be incorporated into the firm's financial performance (Keats, 1990). Only companies with complete data on all variables were included in the statistical analyses.

Measurement of Variables

Performance Measures. Accounting measures of firm performance have been a staple among diversification studies and therefore, in order to maintain the comparability of the present study return on assets (ROA) was used to measure performance (Delios & Beamish, 1999; Geringer, et al., 1989; Geringer et al., 2000; Kim et al., 1989; Tallman & Li, 1996). ROA, an accounting-based measure of financial performance, was measured as: ROA = Earnings Before Interest and Taxes/Total Assets. In an effort to present a more comprehensive view of the performance-diversification linkage a market-based measure of performance was included in the study. Tobin's Q was selected due to its popularity (Chung & Pruitt; 1994; Finkelstein & Boyd, 1998; Lu & Beamish, 2004; Miller, 2004) as a measure of performance. Tobin's Q was used to reflect investor's expectation about a firm's future performance and therefore, a future oriented measure of firm performance (Amit & Livnat, 1988; Gaver & Gaver, 1993; Smith & Watt, 1992). Tobin's Q = (Market Value of Equity + Liquidating Value of Preferred Stock + Value of Total Debt)/Total Assets

Product Diversification. Product diversification can be measured using a variety of different measures. However, we choose to limit our study to one of the most commonly used continuous measures of diversification; the Herfindahl index, which has been shown to be both a reliable and valid measure of diversification. The Herfindahl index reflects the relative contribution of the major product/business segments of a firm to overall firm sales. The Herfindahl index of product diversification (HPDVSF) was measured as: HPDVSF = 1- Σ S_j^2; Where S_{ii} = the proportion of a firm's sales reported in product group $_j$. The product diversification index will equal zero for a firm involved in only one business. An index score of zero indicates that a firm in not diversified. On the other hand index values greater than zero reflect increasing levels of product diversification. Based on prior research which has reported non-linear relationship between

performance and diversification (Geringer et al., 2000; Palich, Cardinal, & Miller, 2000) a variable to test for such a relationship was incorporated in the study. Taking the square of product-based measure of diversification and including it in the regression analysis will highlight any non-linear relationship (Geringer et al., 2000).

Market Diversification. Market-based or multinational diversification was measured as the proportion of a firm's sales revenue derived from overseas markets (i.e., global market diversification by export activity). As has been previously done, multinational diversification was derived from foreign operations and export volume (Geringer et al., 1989; Grant et al., 1988; Wolf, 1975). Therefore, multinational diversification (MLDVSF) was measured as: MKDVSF = FS_{ii} / TS_i ; Where FS_i = sales by exports in year I, TS_i = total sales in year I.

The multinational diversification index reflects increasing levels of foreign trade. Firms with higher multinational diversification represent firms that are more actively engaged in foreign trade. To assess the degree of non-linearity within the market diversification-performance linkage, the market diversification index squared was included in the study (Geringer, et al., 2000, Geringer et al., 1989; Hitt et al., 1997).

Strategic Resource Variables. Since firm performance is influenced by a variety of strategically important resource variables other than market and product diversification, a select group of variables were included as control variables. The strategic resource variables that were included in the present study were R & D intensity, financial leverage (DEBT), firm size, and accounts receivable. Each of these strategic resource variables was calculated as the simple average over the period of 1997-2001, where: R&D= R & D Expenditures / Total Sales; DEBT leverage = Book Value of Total Debt / Shareholders' Equity; SIZE = Ln (Total Sales)

RESULTS AND ANALYSIS

Results of Regression Analysis

Using hierarchical regression, the results of the regression analyses testing the effect of various variables on performance are presented in Tables 2a and 2b. All regression models were highly significant (p < .001), indicating that the regression models were useful in explaining firm performance differences among the sample.

Table 1. Descriptive Statistics and Correlations[a]

Variables	mean	st.dev	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Dummy-USA	0.49	0.50														
2. Dummy-JAP	0.25	0.43	-.564***													
3. Dummy-EEC	0.26	0.44	-.580***	####***												
4. Dummy-Hi vs. Lo	0.72	0.45	.007**	.058	####											
5. Return on Assets (ROA)	7.94	11.55	.110+	####**	.087	.055										
6. Tobin's Q	1.01	0.54	-.128*	####**	.319***	.031	.070									
7. Firm Size (Ln Sale)	15.85	1.05	.036	.068	####+	-.092	####***	-.025								
8. R&D Intensity	4.74	3.92	.021	####**	.154*	.508***	.225***	.177**	-.281***							
9. Account Receivable	1.42	0.48	-.079	####*	.255***	.272***	.182*	.074	-.144*	.369***						
10. Debt Leverage	0.30	0.37	.116+	####	####+	-.165*	####*	-.162*	-.027	####**	####**					
11. Product.Divsf (PRDVSF)	1.02	0.41	-.204**	####**	.459***	-.053	####	.176*	.067	.098	.124+	-.097				
12. Market Divsf (MKDVSF)	0.94	0.37	-.248***	####***	.597***	.090	.138*	.413***	-.092	.315***	.236**	-.195**	.154*			
13. Squred PDVSF	1.21	0.80	-.200**	####**	.467***	-.006	####	.179*	.088	.103	.158*	-.116+	.966***	.179*		
14. Squared MKDVSF	1.02	0.74	-.299***	####***	####***	.086	.144*	.406***	-.105*	.315***	.251***	-.184*	.203**	.875***	.229**	
15. PRDVSF x MKDVSF	1.26	0.85	-.266***	####*	.485***	.009	####*	.276***	.097	.083	.188*	-.110+	.881***	.199**	.798***	.251***

[a] n=186. Unstandardized parameter estimates are shown. Standard errors are in parentheses.

Significance level: * P<0.05; ** P<0.01; *** P<0.001; + P<0.10

After a review of the results, several interesting findings bare mentioning. First, it was clear from the results of the present study that the impact of diversification on firm performance was highly sensitive to the measures used for assessing performance. For instance, when ROA was used as a proxy for performance product diversification was

found to have a negative impact on a firm's performance. This would support Hypothesis 1. However, with Tobin's Q was used as a measure of performance no significant relationship between product diversification and performance was observed (rejecting Hypothesis 1). The same mixed results were observed for multinational diversification and firm performance, except that Tobin's Q was positively correlated with multinational diversification (supporting Hypothesis 2) and not significantly correlated with ROA (rejecting Hypothesis 2).

Since ROA and Tobin's Q were employed as examples of accounting- and market-based proxies of firm performance, respectively, such findings may reflect the financial markets' preference for multinational diversification over product diversification. Given the ever increasing opportunities to enter foreign countries and expand into new markets with existing products, as opposed to traveling the more traditional route of developing new products, these results may a function of different levels of risk. Since the countries included in this study represent a collection of the most developed and stable economies of the world an inherent bias may have been uncovered. The overall stability of the economic, social and political environments of the U.S., Japan, and the EEC may be having an effect on the perception and evaluation of risk. Due to the riskiness of R&D and its low success rate, entering mature and stable international markets with proven products could be considered a lower risk than in previous years.

There was evidence to support the contention that a curvilinear relationship between performance and diversification does indeed exist. However, the data were split depending on which measure of performance was used. For instance, when performance was operationalized as ROA, a curvilinear relationship was observed for product diversification. This would suggest that as firms continue to diversify, as defined by the number of different products/businesses in which a firm is actively involved, that there is an optimal degree of diversification in which a firm can maximize its returns. As a firm continues to diversify beyond this optimal level it would be expected that they would recognize a corresponding reduction in profitability. This finding concurs with previous studies that have found curvilinear relationships (Geringer et al., 2000; Palich, Cardinal, & Miller, 2000).

Table 2 (A). Hierarchical Regression Analysis: Return On Assets (ROA)[a]

	Step 1	Step 2	Step 3
(Constant)	22.531 (5.70) ***	24.551 (5.63) ***	26.832 (5.89) ***
Dummy - JAP	-5.332 (0.79) ***	-5.645 (0.79) ***	-5.383 (0.79) ***
Dummy - EEC	-3.484 (0.83) ***	-1.765 (1.05)	-1.659 (1.04)
Dummy - High vs. Low	-0.645 (0.85)	-0.806 (0.83)	-1.009 (0.84)
Firm Size (Ln Sales)	-0.892 (0.34) **	-0.785 (0.33) *	-0.805 (0.33) *
R&D Intensity	0.358 (0.12) **	0.443 (0.13) ***	0.466 (0.13) ***
Accounts Receivables	0.556 (0.77)	0.515 (0.76)	0.459 (0.75)
Debt Leverage	-2.222 (0.90) **	-2.448 (0.88) **	-2.322 (0.88) **
Product Divsf.(PRDVSF)		-2.498 (0.91) **	-7.429 (3.03) *
Market Divsf. (MKDVSF)		-1.766 (1.17)	-1.755 (1.17)
Squared PRDVSF			3.969 (1.85) *
Squared MKDVSF			-0.078 (0.04)
PRDVSF x MKDVSF			-1.407 (1.01)
Model R^2	0.3942	0.4291	0.4482
Adjusted R^2	0.3628	0.3908	0.4024
Model F- value	11.7925***	12.3361***	9.8758***
Change in Adjusted R^2		0.0285	0.0116
Partial F due to Δ in R^2		0.0482*	0.0254

[a.] n = 186 Unstandardized regression coefficients are shown and Standard errors are in parenttheses
   Significance level: + P<0.10; * P<0.05; ** P<0.01; *** P<0.001

Likewise, when Tobin's Q was utilized to measure performance, the curvilinear relationship of multinational diversification reported by Geringer, et al. (2000), Geringer et al. (1989) and Hitt et al. (1997) was supported. Although previous studies did not make use of market-based measures of performance in detecting such curvilinearity, the present study clearly shows the demarcation between accounting- and market-based measures of firm performance.

Multinational diversification is shown to have a curvilinear relationship with regard to market-based measures of performance. The financial markets' assessment of risk when it comes to expanding internationally seems to have a limit, beyond which firm performance suffers.

However, product diversification, although exhibiting a curvilinear relationship with accounting-based performance, leads to an entirely opposite conclusion. There is a U-shaped relationship between ROA and product diversification and an inverted U-shaped relationship between international diversification and Tobin's Q. For product diversification, firms report two optimal levels of performance (ROA) at either low or high levels of diversification. This finding is in direction confrontation with most of the extant literature on diversification. How much of this result is attributable to the international composition of the sample being using in this study is not readily apparent.

Another difference between performance measures was observed with comparing firms from different countries/regions. Results reflect an overall positive and consistent performance bias towards U.S. firms over the period beings studied. On the other hand, Japanese firms were shown to enjoyed poorer performance when ROA was used to measure profitability. There was no significant relationship with performance for Japanese or EEC firms when Tobin's Q was used to measure performance. Given differing international accounting standards, the use of ROA or Tobin's Q may not be a suitable or stable measure when applied to different countries. Differences may also be attributable to variations in cultures (differential values of asset valuation), values, and their attendant effect on the goals of the firm. For instance, the use of ROA may not be a good indicator of the long-term viability of a firm, something that Japanese firms tend to place a great deal of emphasis on when developing their strategies. From this perspective ROA may be criticized as short-term measure of profitability.

No differences were observed between high-tech and low-tech firms. While high-tech firms would be expected to generate higher profits than low-tech firms in general, the additional costs associated with competing in high-tech industries may have a dampening effect on firm profits. Accounts receivable was negatively correlated with Tobin's Q, but not ROA, which was not significantly correlated. Given that accounts receivable are in effect short-term loans made by the firm to its customers, it is not surprising that the financial market takes a dim view of such behavior, seeming them as unsecured loans that may not be collectable in the future.

Table 2 (B). Hierarchical Regression Analysis: Tobin's Q[a]

	Step 1	Step 2	Step 3
(Constant)	2.019 (0.73) **	1.763 (0.72) **	2.023 (0.74) *
Dummy - JAP	-0.097 (0.10)	-0.044 (0.10)	-0.098 (0.10)
Dummy - EEC	0.415 (0.11) ***	0.213 (0.13)	0.165 (0.13)
Dummy - High vs. Low	-0.071 (0.11)	-0.064 (0.11)	-0.078 (0.10)
Firm Size (Ln Sales)	-0.058 (0.04)	-0.067 (0.04)	-0.078 (0.03) *
R&D Intensity	0.060 (0.02) ***	0.049 (0.02) **	0.049 (0.02) **
Accounts Receivables	-0.195 (0.10) *	-0.196 (0.10) *	-0.220 (0.09) *
Debt Leverage	-0.132 (0.11)	-0.092 (0.11)	-0.110 (0.11)
Product Divsf.(PRDVSF)		0.050 (0.12)	0.037 (0.38)
Market Divsf. (MKDVSF)		0.455 (0.15) **	0.419 (0.15) **
Squared PRDVSF			-0.396 (0.23) +
Squared MKDVSF			-0.217 (0.10) *
PRDVSF x MKDVSF			0.418 (0.13) ***
Model R^2	0.2704	0.3245	0.3858
Adjusted R^2	0.2314	0.2765	0.3275
Model F- value	6.8254***	7.3245***	8.3725***
Change in Adjusted R^2		0.0451	0.0367
Patial F for Change in R^2		0.0542**	0.0613**

a. n = 186 Unstandardized regression coefficients are shown and Standard errors are in parenttheses
   Significance level: + P<0.10; * P<0.05; ** P<0.01; *** P<0.001

Consistent with previous diversification research R&D was found to be positively correlated with both measures of performance. Whether the increase in R&D intensity was a result of higher profits or the source of higher profits cannot be determined given the methodology employed in the present study. However, the general rule that R&D may

lead to future successes that will in turn improve a firm's profitability seems to be a reasonable proposition. Regardless of which measure of performance was used the results were consistent and positive. R&D is seen as an important component of a firm's current performance, as evidenced by ROA, and the assessment of a firm's future potential to generate profits, as shown by Tobin's Q.

Another interesting finding was found for a variable which has been consistently found to be highly correlated with firm performance; namely, firm size. In general, firm size and diversification have been found to be positively correlated, given that the nature of diversification seems to be defined by an increase in size. If a firm is going to diversify into a new product or industry it would stand to reason that the size of the firm would reflect this increase in the form of new production facilities and distribution channels, not to mention the associated increases due to advertising and marketing of new products. However, such increases in size come at the expense of overall corporate profitability, as evidenced by the negative relationship between ROA and firm size. Firm size was not consistently associated with firm size when Tobin's Q was used, which may have a neutralizing effect on firm size.

The interaction between market- and product-based diversification was significant on for models using Tobin's Q, indicating that the combination or interaction of these two variables has a strong effect on firm performance when measured using a market-based measure of performance. However, the interaction effect was not significant when ROA was used to measure performance. The difference between accounting- and market-based measures may be an indication of idiosyncratic relationships between diversification measures and performance proxies, something that Keats (1990) seems to suggest in here call for better conceptualizations of the diversification and performance constructs.

Another interesting finding is the negative and consistent effect of financial leverage on ROA, suggesting that leverage and performance are negatively associated. However, market-based measures of performance do not reveal the same relationship, with no significant results being observed. The treatment of debt under the two measures of firm performance would obviously have an effect on the results.

CONCLUSIONS

In summary, our results indicate that international and product diversification had different effects on firm performance depending on how performance was operationalized. In general, product diversification was found to be negatively related to firm performance when performance was measured using an accounting-based proxy (ROA), while international diversification was positively associated with a market-based measure of performance (Tobin's Q). The findings of this study highlight the importance of choosing performance measures carefully when investigating diversification. Depending on how performance was measured the results of previous studies may be called into question, given that significant differences exist between accounting- and market-based measures.

There is evidence to support the existence of a non-linear relationship between international and product diversification and firm performance (Palich, Cardinal, & Miller, 200). However, the direction of the curvilinearity varied greatly depending on the type of diversification and performance measure employed. For instance, international diversification exhibited an inverted U-shaped curve that has been found by previous researchers (Geringer et al., 2000; Palich, Cardinal, & Miller, 2000) suggesting that there is an optimal level of international diversification that will maximize corporate returns.

Although results using product diversification likewise revealed a U-shaped curve, the direction of linearity was reversed. A normal U-shaped curve revealed not an optimal level of product diversification, but two optimal levels of diversification (high and low levels of product diversification both showing higher levels of performance when using ROA as an indicator of performance). Such a finding is in direct contradiction to commonly accepted studies in the field. One potential explanation for such a finding is the significance of a combination effect between product and international diversification. The inclusion of an international sample containing a range of firms from widely disparate markets may also have contaminated the study. It is possible that different levels or degrees of linearity for the diversification-performance linkage may exist among countries, a point that should be investigated in future studies.

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