EFFECTS OF INTERNATIONAL DIVERSITY AND PRODUCT DIVERSITY ON THE PERFORMANCE OF MULTINATIONAL FIRMS

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This study examined the relationships among international diversity, product diversity, and firm performance. For a sample of large American industrial multinational enterprises (MNEs), it showed a consistent quadratic relationship between product diversification and MNE performance but minimal performance differences across different measures of international diversity. Analysis of the interactions of international diversity and product diversity indicates a weak effect from increasing internationalization on the performance effect of product diversity.

Companies have been engaged in efforts to diversify (or to refocus) their product offerings and their geographical markets for many years. Researchers have been engaged in the organized analysis of diversification strategies and their effects on firms’ performance levels for almost as long, certainly since Chandler’s *Strategy and Structure* was published in 1962. Conceptually, diversification makes sense and should be profitable, up to a limit. Resource-based theory (Barney, 1991) and core competency theory (Prahalad & Hamel, 1990), which locate competitive advantage with the internal capabilities of a firm, suggest that diversification into products that use the existing “rent-yielding” resources of the firm will generate economies of scope in the use of these resources and therefore will yield greater profitability. However, transaction cost theory suggests that excessive growth will eventually raise governance costs and reduce profits (Jones & Hill, 1988).

Although resource-based models have not been applied widely to multinational firms, leverage and economies of scope and scale in their resource applications across national markets should enable multinationals to improve their returns on resource investments while reducing the variance of their cash flows (Kim, Hwang, & Burgers, 1993). Although external influences

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Rent-yielding resources are those assets of a firm that can earn profits above a fair market return (generate economic rents) because of their scarcity value.
are more varied than in the case of product proliferation in a single market, gradual expansion through related markets or marketing of global products (Levitt, 1983) can reduce external uncertainties. In this way, geographical diversification is conceptually similar to engaging in related product diversification to generate profits. Indeed, Fladmoe-Lindquist and Tallman (1994) proposed that the major models of the multinational firm can be seen as quite compatible with resource-based theory. Transaction cost models of the multinational firm do not generally suggest limits on internalization.

The results of extensive empirical analysis of both product and geographical diversification effects on performance are inconclusive and contradictory, as Datta, Rajagopalan, and Rasheed (1991), Grant, Jammime, and Thomas (1988), and Grant (1987) have discussed at length. Therefore, continued efforts in this direction appear to be useful. This study examined the performance effects of different degrees of product diversity and international geographic diversity on the part of American multinational manufacturing firms. First, we tested whether the relationship of performance to degree of product diversity is linear or curvilinear, an issue left unclear in the literature. Next, we examined the effect of different measures of international diversity on performance, again a relationship that has been tested with a variety of results. Finally, we pursued the interactive effects of product and international diversity on firm performance to determine if the scale and scope of international diversity moderate the performance effects of product diversity. The results of the empirical study suggest that the many studies that have focused on a single aspect of diversification have made an unjustified assumption of homogeneity in other directions.

**THE DIVERSIFICATION LITERATURE**

Although the existing literature on diversification is perhaps one of the largest bodies of work in business strategy, findings have been contradictory. Several articles provide extensive reviews of this literature (cf. Datta et al., 1991; Grant, 1987; Grant et al., 1988). We summarize their findings, concentrating on those articles that specifically address the key issues addressed in this article.

It seems fair to say that the performance effects of product diversity are not clear. Datta and colleagues (1991) distinguished among degree, type, and mode of diversification. Early studies based on Standard Industrial Classification (SIC) categories found no significant performance effects from degree of diversification (Palepu, 1985). Rumelt’s (1974) seminal study of qualitative types of diversification found differences across his relatedness categories, but subsequent studies using his methodology (e.g., Christensen & Montgomery, 1981) have both confirmed and disputed his findings and have proposed different intervening variables, such as industry identification or firm size, to explain them. Recently, more sophisticated SIC-based continuous measures of degree of diversity have found that moderate degrees of diversity predict higher performance. Hoskisson, Hitt, Johnson, and Moesel (1993) showed that a typology variable and an SIC code–based entropy variable both had high loadings on a single latent variable that, in turn, was negatively
and significantly related to accounting-measure-based performance. Thus, better measures suggest that type and degree of product diversification are closely related. Perhaps the most common finding is that related diversification seems to predict superior growth in performance measures (cf. Datta et al., 1991). Results favoring dominant or related diversification are intuitively appealing because they support the concept that core resources can be “leveraged” across related businesses and generate competitive advantage through scope effects. Unfortunately, other work has shown either no performance effect of related diversification or shown that firms with either single-business or unrelated-diversified strategies outperform related diversifiers (Lubatkin, 1987; Michel & Shaked, 1984; also see summaries in Grant et al. [1988] and Datta et al. [1991]). These discrepancies may result from unlike measures or methods or from underlying nonlinearities in the performance-diversification relationship.

Geographical diversification has also been tested a number of times with conflicting results (cf. Grant, 1987). Grant suggested that multinationalism itself should confer advantage over nonmultinational firms. The theory of the multinational suggests that multinational firms have opportunities to gain greater returns to intangible resources, to use market power, to spread their market risks, and to seek less expensive inputs and less price-sensitive markets (Kim, Hwang, & Burgers, 1993). They can arbitrage across factor markets and leverage their market power to both reduce input costs and control output markets (Kogut, 1985). International diversification (defined in different ways) has generally been found to improve operating performance, though when variables such as firm size, national identity, and industry characteristics are introduced as controls, its significance is reduced (Grant, 1987). Ramaswamy (1993) found that two measures of international diversity interacted to produce significant performance results. However, this is not always the case (Michel & Shaked, 1986; Siddharthan & Lall, 1982). Market returns show both positive and negative relationships to multinationality, although multinationals seem to have lower levels of risk. Inconsistent results are not surprising as the different measures used to describe geographical diversification are not necessarily related to each other (Cosset & Nguyen, 1991). Evidence suggests that firms with significant performance advantages tend to be multinationals but that the direction of the causal relationship may well run from high levels of firm-specific capabilities to higher performance to international diversification, rather than from capabilities to multinationality to higher performance.

Studies of Combined Product and Market Diversification

A small number of existing studies examine the combined effects of product and geographical diversification. Geringer, Beamish, and da Costa (1989) showed that high geographical diversification, measured as the ratio of sales by foreign subsidiaries to total sales, can be a significant predictor of superior performance but that this positive correlation may reverse at very high levels of diversification, probably as a result of excessive management
costs. They also found that dominant and related-product diversification types improve performance over single-product and unrelated diversification types, but they found no significant joint effects.

Grant and colleagues (1988) reported on a test of separate multinational and product diversification effects on performance for a group of British manufacturing firms. They found that an accounting measure of performance was explained by a Herfindahl-type continuous measure of product diversification in a quadratic function. This outcome suggests that intermediate degrees of product diversification increase performance, but higher levels of product diversification result in falling performance. Multinational diversification, measured by a ratio of sales from operations outside a home country to total sales, showed a linear positive effect on performance level. A Rumelt-type typology of diversification was found to be nonsignificant. These authors did not test for joint effects.

Two other studies have examined the effects of international diversification on the relationship between product diversification and performance. Franko (1989) found that for a sample of internationally diversified global firms, unrelated product diversification was negatively related to performance. Of course, this result is much the same as those for nonmultinational firms. Kim, Hwang, and Burgers (1989) demonstrated that the impact of different degrees of corporate diversification, measured by an entropy measure of relative sales, on corporate profit performance was contingent on the degree of multinationalization, measured by foreign employee ratio.

These studies have examined both product and geographical diversification effects on performance but, excepting Kim and colleagues (1989), they have had little to say about the actual interaction of the two directions of diversification. However, they have introduced the concept that international diversification may affect the same performance measures as, or moderate the performance effects of, product diversification. Both product diversification theory and the theory of the multinational firm address issues of economies of scope in application of strategic resources and of efficient transaction governance, either across business or national boundaries. The similarities in theoretical basis and performance effects of the two directions of diversification suggest that the potential for significant interaction is high. We examine this perception in the empirical portion of this article.

**MODEL AND HYPOTHESIS**

This study examined the relationship of product diversity and international diversity to firm performance levels. We expected to find that limited levels of diversity, whether product or international, would be related to higher levels of performance.2 We expected, too, that the performance effects

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2 Up to this point, the common term “diversification” has been used to describe scope of products or markets. However, Grant and colleagues (1988) make a distinction between diversity as a static concept and diversification as a process. As our empirical study was cross-sectional, we will use “diversity” as our term for our independent variables.
of product diversity would interact with or be moderated by the level of international diversity (Datta et al., 1991: 553).

**Product Diversity**

Resource-based (Conner, 1991), core competency (Prahalad & Hamel, 1990), and dynamic capability (Teece, Pisano, & Shuen, 1990) theories all attribute superior performance to competitive advantage based on idiosyncratic factors internal to firms. These “strategic” resources (Chi, 1994) are combined to generate superior outputs and can be applied across a variety of related output categories. Such unique resources are in limited supply and thus can generate consistent sustained “quasi-rents” (Peteraf, 1993). Leveraging strategic resources across product lines should provide economies of scope in addition to appropriating rents from more customers. So long as diversification stays within the scope of these resources and capabilities, it will provide increasing rents. Unrelated diversification that goes beyond this scope will not generate additional rents.

At the same time, Jones and Hill (1988) hypothesized, from a transaction cost basis, that diversification beyond a certain degree raises internal governance costs to the point that performance suffers, even in multidivisional firms. Related diversification depends on reciprocal dependency relationships within a firm. As the number of internal transactions increases exponentially with diversity, costs rise rapidly. Further, unrelated diversification, which relies on pooled interdependencies that increase linearly, can permit more divisions but will also eventually raise governance costs beyond any transactional benefit, thereby reducing efficiency.

Combining the transaction cost perspective with the resource-based viewpoint suggests that performance will vary with product diversity in a nonlinear relationship, increasing as strategic resources are given greater scope but falling off as product scope exceeds the range of these resources and governance scope surpasses management capabilities. The higher rents of related diversification are offset by more rapidly increasing governance costs, and the less costly unrelated diversification generates fewer rents. The findings of Grant and colleagues (1988) on degree of diversity and of Geringer and colleagues (1989) on relatedness of diversification type support this expectation. The performance of related diversification should surpass that of unrelated diversification. Lubatkin and Chatterjee (1994) found a curvilinear relationship between stock market return risk and a typology measure of product diversification. Christensen and Montgomery (1981) and Hoskisson and colleagues (1993) found high levels of congruence between diversification type and degree of diversity. Therefore, in terms of degree of diversity, we state the concept formally as

*Hypothesis 1a*: Performance should vary positively with degree of product diversity.

*Hypothesis 1b*: Performance should vary negatively with the square of degree of product diversity.
International Diversity

Dunning’s “eclectic model” (1988, 1993) applies a logic similar to resource-based models to the multinational firm. A firm with profit-making internal capabilities (ownership factors) will seek additional profits in international market locations. If these capabilities are embedded in the firm’s structure, these international markets will be internalized by foreign direct investment, ensuring the best application of these capabilities while protecting them from compromise (Buckley, 1988). So long as the ownership factors can be applied profitably, the firm will expand its international scope. Vachani (1991) suggested that this expansion may be limited by relatedness considerations across geographical markets, much like product scope expansion. However, proponents of internationalization models (e.g., Johanson & Vahlne, 1977) have proposed that experience in international markets permits firms to gradually increase their commitment to geographical expansion. The ability to manage extensive networks of international subsidiaries at low transactional costs seems to be a key capability of successful multinational firms. International diversification may have governance cost limits to its scope for a given firm at a given time, but these limits expand with experience as management capabilities increase. Relatedness and nonlinearity of the relationship between geographical diversity and performance may be specific only to certain contexts.

Kim, Hwang, and Burgers (1993) argued that the more multinational a firm is, the greater its opportunities to leverage strategic resources while simultaneously diversifying market risks, thus raising its performance. Multinationality—or the size of internalized international operations relative to overall operations—indicates the strategic importance of foreign operations and also implies the existence of strategic resources through the need for internal governance. Existence of internal foreign operations is a common reference point for defining multinational enterprises. One measure of multinationality, used by Geringer and colleagues (1989) and Grant and colleagues (1988), is the ratio of sales from foreign operations to the total sales of a firm. Other studies have used foreign asset ratio (Ramaswamy, 1993) or foreign employee ratio (Kim et al., 1989). None of these measures address the breadth or scope of foreign operations, focusing instead on the overall strategic importance of foreign operations to a firm. Although Geringer and colleagues (1989) suggested a nonlinear relationship of multinationality and performance,3 other studies have not supported it (Grant et al., 1988). Our logic as stated above suggests

Hypothesis 2: Performance should vary positively and linearly with the degree of multinationality.

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3 Geringer and colleagues (1989) reported that when sales from foreign subsidiaries rise into the 80–100 percent quintile, the relation to performance turns negative. They provided no theoretical cause and found these results only for data standardized by continent of origin. We do not hypothesize such a relationship.
A second approach to international diversity is to select a measure of the breadth or scope of international operations as a determinant of performance. Shaked (1986) defined multinational corporations as those having 20 percent of sales abroad and also direct investment in at least six countries. Porter (1986) depicted two key dimensions of international strategy, coordination and configuration of operations across countries, which varies from concentrated to dispersed. Compared to multinationality ratios, which indicate the scale but not the breadth of international diversity, measures of configuration or of the geographical scope of international operations address the ability to arbitrage operations across countries and leverage location-based advantages (Kogut, 1985). By supplying such advantages, geographical scope should improve performance. Ramaswamy (1993) measured configuration as number of overseas plants and found a strong positive relationship to performance, also noting that a count of the number of countries in which plants are located gives similar results. Losses due to overexpansion should be mitigated by the typical gradualism of internationalization and by highly developed skills at managing international subsidiaries in a sample of multinational firms. We suggest a linear relationship, given as

**Hypothesis 3:** Performance level should vary positively with the geographical scope of international operations.

If international scale economies and geographical scope economies indeed address different aspects of internationality and are not identical in their performance effects, the interaction of the two effects should affect performance independent of the individual effects. For global firms, the economies of large scale plus the ability to leverage the concomitant market power across multiple boundaries and to seek less competitive markets for monopoly rents suggest a positive interactive effect. At the same time, a multidomestic strategy might imply that many markets simply dissect large amounts of overall international activity into many small, independent, and nonreinforcing parts that destroy any potential scale economies. Empirically, Ramaswamy (1993) showed that international configuration, or scope of operations, acts to moderate the scale effects of multinationality. The positive effect of configuration causes the effect of multinationality to change sign while retaining a low level of significance. He suggested that this may explain the instability of results in studies of multinationality. The combination of theory and empirical results suggests that the two aspects of international diversity have a positive interaction.

**Hypothesis 4:** Performance should vary positively with the interaction of multinationality and country scope.

**Interaction Effects of International Diversity and Product Diversity**

If related or moderate degrees of product diversity are expected to promote better performance than single-business or unrelated-diversified strategies, and international diversity is also expected to improve performance, just how can these diversity variables be expected to act together? Transaction
cost theory suggests that high levels of diversity will, in general, raise the
cost of governing firms (Williamson, 1985). Thus, excessively high degrees
of product and international diversity together should depress performance,
as costs outstrip returns to strategic resources that are applied on an exces-
sively broad scope (Jones & Hill, 1988). A firm that tries to apply a broad
product portfolio on an integrated global basis may well stretch its manage-
ment resources excessively.

In empirical studies, Geringer and colleagues (1989) tested for the effects
of the interaction of product and international diversification on performance
but found no significant effects. Kim and colleagues (1989) showed that the
impact of product diversification categories on performance was contingent
on degree of multinationalism. Where Kim and colleagues (1993) showed that
multinationality should improve risk-adjusted performance, Franko (1989)
showed that high levels of product diversification in geographically diverse
multinationals leads to lower performance. We suggest that multinationality
should improve the performance of low-product-diversity firms by providing
risk diversification and a broader customer base over which to gain economies
of scope to fixed resources. Moderate levels of both directions of diversity
alone are associated with improved performance, but Kim and colleagues
(1989) showed no effect of global diversification on related-diversified firm
performance. However, they do show that more product-diversified firms
perform better when they are more geographically diversified, contrary to
Franko (1989) and to intuitive expectations, and that high geographical diver-
sification seems to eliminate performance differences between levels of prod-
duct diversity. The evidence suggests that more geographical diversity may
improve the performance of undiversified firms, seems to have no effect on
related-diversified firms, and reduces the curvilinear effects of unrelated
diversification. These effects suggest that increasing levels of international
diversity should reduce the impact of product diversity on performance by
“flattening the regression curve.” Therefore, we suggest

Hypothesis 5: The interaction of international and product
diversity should reduce the effects of varying levels of prod-
duct diversity on performance.

DATA, VARIABLES, AND EMPIRICAL TESTS

In our empirical model, independent variables measuring level of prod-
uct and international diversity are predicted to explain one or more depen-
dent variables measuring performance. The measures of international diver-
sity are expected to interact with and moderate the effects of the product
diversity measures. The explanatory relationship is further affected by con-
trol variables measuring exogenous conditions of either the industries or the
organizations tested. Datta and colleagues (1991) suggested that the indepen-
dent variables may appear as one of three types—continuous measures of
degree of diversity, categorical measures of diversification strategies, or typol-
ogies of diversification mode. Several empirical studies of product diversity,
such as Kim and colleagues (1989) and Hoskisson and colleagues (1993), have
used continuous measures (entropy measures in these studies) to develop categories through clustering procedures and then used these data-driven categories to explain performance differences. Most studies of geographical diversification use some form of continuous measure to describe the degree of internationalization of sales or multinationalization of operations, although Geringer and colleagues (1989) again created a categorical variable for degree of internationalization. We tested our model using continuous measures.

The model was tested on a sample of 192 large U.S. multinational manufacturing firms. These are all of the U.S. firms listed in the third (and latest) edition of Directory of Multinationals (Stafford & Purkis, 1989), a directory of the world’s 450 largest industrial corporations with significant foreign direct investments, less four firms for which key data were not available. Firm-level data were collected from the financial tables of the Directory for 1987, the most recent year. Data for the diversity measures were available only for 1987 in many cases. In balancing sample size against use of multiyear data, we considered that previous studies had used multiple years only to calculate average values and chose to go with the largest sample, accepting more noise in the data. This sample is obviously biased, as it consists of large American industrial firms. It was chosen for comparability to Grant and colleagues’ (1988) sample of large British manufacturing firms. However, we should note that American multinationals are typically less internationalized than similar firms from smaller markets. In addition, all the studied firms are multinationals, so that comparisons to strictly domestic firms are not possible.

Performance is most often measured in diversification studies by profit to sales or profit to asset ratios. In this study, we present findings based on a return on sales (ROS) measure as our dependent variable in all models. Geringer and colleagues (1989) provided an extensive argument in favor of using sales-based measures to avoid the effects of differential asset valuations resulting from new investment and depreciation.

As our independent variables, we used cross-sectional measures of diversity. Our measure of product diversity is a Herfindahl-type quantitative index, like that of Grant and colleagues (1988), based on the share of a firm’s sales in each four-digit SIC industry (Berry, 1975) and defined as product diversity $= 1 - \sum S_i^2$, where $S_i$ is the proportion of a firm’s sales reported in product group $j$. This measure, therefore, takes into account the number of segments in which a firm operates and the relative importance of each segment in sales. \(^4\)

\(^4\) Hoskisson and colleagues (1993) and others have argued for the value of accounting measures of performance and demonstrated the correlation of various such measures. We also tested return on assets, obtaining similar but slightly weaker results.

\(^5\) This study also tested a subjective categorical measure of diversity to explain MNE performance. We tested the two measures for their comparability in describing diversification using an ANOVA. The means of the Herfindahl index for the four strategic categories are 0.29 (single business), 0.50 (dominant business), 0.63 (related business), and 0.72 (unrelated business), respectively. T-tests show that these mean values are significantly different. This result is consistent with the finding of Hoskisson and colleagues (1993). All the diversified categories
We used two measures of international diversity: multinationality and country scope. Multinationality is measured as the proportion of a firm’s sales derived from operations outside the home country to total sales. Although it includes resale of intermediate goods and thus is not an absolute measure of the size of foreign operations, both Geringer and colleagues (1989) and Grant and colleagues (1988) used the measure, which seems to provide a reasonable relative indicator of international diversity. Country scope, as a proxy for the geographical scope of international operations, was measured as the number of foreign countries in which an MNE had operating subsidiaries in 1987. As most discussions of competitive advantage derived from the scope of international operations address tax, currency, economic, and political arbitrage, and as various firms structure their country operations differently, a country count seems to address scope issues better and less arbitrarily than a subsidiary count. As noted above, Ramaswamy (1993) used both foreign plant counts and foreign country counts in his study with similar results. We also tested the effects of the interaction of these two measures. In trying to precisely define its role in the diversity-performance relationship, we tested international diversity both as an independent variable (Hypotheses 2, 3, and 4) and as a moderator of the effects of product diversity (Hypothesis 5). Ideally, we would have controlled for the effects of different structural forms and strategic interactions of the subsidiaries of these multinationals. This was not feasible using the secondary data available to us. Therefore, effects of formal structure and global integration levels in combination with international diversity were not tested.

Following Grant and colleagues (1988), we also controlled for other variables that are likely to affect firm performance, including firm size, leverage, and industry growth. Firm size, a commonly used control variable often related to diversity levels, was measured by total revenues for 1987. Firm leverage is measured as the percentage of long-term debt to total capital (debt plus equity). Prior research has shown industry effects to have important impacts on cross-sectional variation of firm performance (Schmalensee, 1985). Some studies have used industry dummy variables (Grant et al., 1988). Christensen and Montgomery (1981) associated performance effects of product diversification specifically with relative industry growth rates. Hence, we included an industry variable, measured as the average annual growth of industry shipment over the 1982–87 period using data from the Survey of Current Business.

RESULTS

Table 1 presents the correlation matrix for the ROS dependent variable and the independent variables.

performed better than the single-business category. We concluded that the continuous measure provided more information and was less subjective, so the Rumelt-type categories were dropped from further analysis. Robins and Wiersema (1995) suggested weaknesses of both measures and proposed a new measure of diversification. We were not able to test their measure.
TABLE 1
Means, Standard Deviations, and Correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>Means</th>
<th>s.d.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Return on sales</td>
<td>5.31</td>
<td>5.21</td>
<td>.08</td>
<td>.14</td>
<td>.01</td>
<td>-.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Product diversity</td>
<td>0.53</td>
<td>0.18</td>
<td>.08</td>
<td>.01</td>
<td>-.14</td>
<td>.40*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Multinationality</td>
<td>28.05</td>
<td>14.19</td>
<td>.01</td>
<td>-.02</td>
<td>.04</td>
<td>-.16*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Country scope</td>
<td>14.54</td>
<td>9.22</td>
<td>.19*</td>
<td>.02</td>
<td>-.19*</td>
<td>.15*</td>
<td>.25*</td>
<td></td>
</tr>
<tr>
<td>5. Firm size</td>
<td>7.12</td>
<td>12.34</td>
<td>-.02</td>
<td>-.19*</td>
<td>.15*</td>
<td>.25*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Firm leverage</td>
<td>0.29</td>
<td>0.18</td>
<td>-.33*</td>
<td>.15*</td>
<td>-.07</td>
<td>.20*</td>
<td>-.08</td>
<td>-.20*</td>
</tr>
<tr>
<td>7. Industry growth</td>
<td>5.34</td>
<td>5.39</td>
<td>.23*</td>
<td>.15*</td>
<td>-.07</td>
<td>.20*</td>
<td>-.08</td>
<td>-.20*</td>
</tr>
</tbody>
</table>

*N = 192.
*p < .05

We used regression analysis to estimate the effects of product diversity and international diversity on MNE performance. Table 2 shows the main effect results of regressing MNE performance on product diversity and international diversity. We tested Hypothesis 1 by regressing performance (ROS) on product diversity and the size, leverage, and industry growth control variables. We modeled the predictions of Hypothesis 1 by introducing the following quadratic relationship between performance and product diversity: 

\[ \text{ROS} = \beta_0 + \beta_1 (\text{diversity}) + \beta_2 (\text{diversity})^2 \]

Hypotheses 1a and 1b predict that coefficient \( \beta_1 \) is positive and that coefficient \( \beta_2 \) is negative. The results are robust and consistent for MNE return on sales (a similar result was obtained for return on assets). A clear quadratic relationship is revealed between MNE performance and the Herfindahl index measure of product diversity (model 1). This result suggests that product diversity and performance are positively related up to a point, after which increases in product diversity are associated with declining performance. The inflection point is just over 0.50 on the Herfindahl index. Hypothesis 1 is supported, and the value of a restrained degree of product diversity is strongly supported for a U.S. sample, concurring with Grant and colleagues' (1988) results for British firms.

Models 2–5 show the effects of multinationality and country scope on MNE performance. In Table 1, only country scope is significantly correlated with performance. Multinationality does not have a significant effect on firm performance (Hypothesis 2 is not supported). For Hypothesis 3, country scope has a weak positive effect \( p < .10 \) on multinational firm performance when estimated with all the control variables.\(^6\) When the two international diversity main effects are estimated together (model 4), country scope has a significant positive effect on ROS. Adding the interaction term (model 5) to test Hypothesis 4 reduces all the international diversity main effect coeffi-

\(^6\) Country scope alone, in a simple regression equation, was highly significant. When the control variables were added, its significance fell dramatically. The regression was also run using country scope squared to test for unpredicted curvilinear effects, but the quadratic term was not significant.
TABLE 2
Product Diversity, International Diversity, and MNE Performancea

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-1.024</td>
<td>7.387**</td>
<td>6.156**</td>
<td>6.947**</td>
<td>6.733**</td>
<td>-0.242</td>
<td>-0.817</td>
</tr>
<tr>
<td></td>
<td>(2.247)</td>
<td>(1.209)</td>
<td>(0.104)</td>
<td>(1.214)</td>
<td>(1.618)</td>
<td>(2.275)</td>
<td>(3.474)</td>
</tr>
<tr>
<td>Firm size</td>
<td>0.021</td>
<td>-0.011</td>
<td>-0.027</td>
<td>-0.026</td>
<td>-0.025</td>
<td>0.007</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
<td>(0.029)</td>
<td>(0.030)</td>
<td>(0.030)</td>
<td>(0.030)</td>
<td>(0.031)</td>
<td>(0.340)</td>
</tr>
<tr>
<td></td>
<td>(2.025)</td>
<td>(2.082)</td>
<td>(2.043)</td>
<td>(2.062)</td>
<td>(2.069)</td>
<td>(2.021)</td>
<td>(2.032)</td>
</tr>
<tr>
<td>Industry growth</td>
<td>0.154*</td>
<td>0.162*</td>
<td>0.138*</td>
<td>0.123†</td>
<td>0.123†</td>
<td>0.130†</td>
<td>0.134†</td>
</tr>
<tr>
<td></td>
<td>(0.067)</td>
<td>(0.068)</td>
<td>(0.068)</td>
<td>(0.069)</td>
<td>(0.069)</td>
<td>(0.068)</td>
<td>(0.068)</td>
</tr>
<tr>
<td>Product diversity</td>
<td>27.289**</td>
<td></td>
<td>26.886**</td>
<td></td>
<td>33.552*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(9.243)</td>
<td></td>
<td>(9.190)</td>
<td></td>
<td>(15.366)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product diversity squared</td>
<td>-26.602**</td>
<td></td>
<td>-26.345**</td>
<td></td>
<td>-34.205*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(9.447)</td>
<td></td>
<td>(9.391)</td>
<td></td>
<td>(16.431)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinationality</td>
<td>-0.009</td>
<td>-0.033</td>
<td>-0.025</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.028)</td>
<td>(0.049)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Country scope</td>
<td>0.075†</td>
<td>0.096*</td>
<td>0.114</td>
<td>0.072†</td>
<td>0.159</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.040)</td>
<td>(0.044)</td>
<td>(0.100)</td>
<td>(0.040)</td>
<td>(0.234)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multinationality × country scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.003)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product diversity × country scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.487</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.985)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Product diversity squared ×</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.543</td>
<td></td>
<td></td>
</tr>
<tr>
<td>country scope</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.984)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R²</td>
<td>0.179</td>
<td>0.141</td>
<td>0.156</td>
<td>0.161</td>
<td>0.162</td>
<td>0.193</td>
<td>0.195</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.157</td>
<td>0.122</td>
<td>0.138</td>
<td>0.138</td>
<td>0.139</td>
<td>0.167</td>
<td>0.160</td>
</tr>
<tr>
<td>F-statisticb</td>
<td>8.11</td>
<td>10.39</td>
<td>11.48</td>
<td>7.11</td>
<td>7.19</td>
<td>8.56</td>
<td>5.53</td>
</tr>
</tbody>
</table>

a Standard errors are in parentheses.
b Probabilities of all F-statistics are less than .001.
†p < .10, two-tailed test
*p < .05, two-tailed test
**p < .01, two-tailed test
The coefficient of the interaction term is also nonsignificant and negative, rather than showing the strong positive effect that Ramaswamy (1993) noted. The coefficient of the country scope variable is fairly consistent across all equations that do not include an interaction term.

To test Hypothesis 5, we first estimated the complete main effect model, which includes the main effects of both product diversity and international diversity on multinational firm performance but no interaction effects (model 6). International diversity is modeled by country scope, as multinationality previously showed no significant main effects. Again, the model shows a consistent quadratic relationship between product diversity and multinational firm performance, and country scope shows a positive effect on performance. All the coefficients are little changed from those in the single direction of diversity models.

In model 7, we include the interaction effect of product diversity and country scope, treating country scope as a moderating variable. We see no significant direct effects from the regression of performance on the interaction of country scope and product diversity but note that the coefficients of product diversity and product diversity squared both increase in magnitude while their levels of statistical significance drop slightly and that country scope becomes nonsignificant. The levels of $R^2$ and adjusted $R^2$ change very little. Hypothesis 5 is not supported.

We controlled for the effects of firm size, leverage, and industry growth in all models. Although not testing theory, the significant results imply that any tests that do not control for such inputs are likely to show spurious results. That the coefficients of determination are still relatively low indicates that even our more complex specifications still explain only a part of MNE performance. Firms in high-growth industries have shown a consistent pattern of better performance, and highly leveraged firms generally show a lower level of performance. Firm size was never significant, but leverage was always highly significant with a negative sign.

**DISCUSSION**

This study reveals a consistent quadratic relationship between product diversity and multinational firm performance across all models. This finding for U.S. manufacturing firms supports this part of the findings of Grant and colleagues (1988) for British manufacturing firms. MNE performance increases as the diversity index increases, but after a certain point it begins to decrease with further diversity. This result suggests that the relationship between degree of product diversity and performance is more complex than the linear relationship implied in most studies of degree of diversification. The result also supports the general findings of studies of diversification type on performance—that related diversification is superior. It also suggests that the implied linearity of rent increases with increasing degree of diversity,

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7 Neither international diversity variable had a significant effect on ROA.
so long as it is related diversity, should be tempered with the governance cost arguments of transaction cost theory as explicated by Jones and Hill (1988).

Our results also show that degree of international diversity, as measured by country scope, has a positive but weaker effect on multinational performance. This follows the configuration findings of Ramaswamy (1993) but is not as strong. Multinationality, however, did not show a significant main effect on firm performance, contrary to the findings of Grant and colleagues (1988) and Geringer and colleagues (1989) but similar to Ramaswamy’s (1993) findings of only weak multinationality effects. Of course, contrary to Ramaswamy, our test of the interaction of the international diversity variables was not significant. Grant and colleagues speculated that their strong multinationality effects might be specific to the context of the United Kingdom’s poor macroeconomic situation of the time of their study, and Geringer and colleagues found significant effects only when their data were standardized for continent of origin, suggesting the significance of context to this effect. Our American sample, derived from a period of a strong domestic economy and a falling dollar, may not show advantages to overseas operations. Neither Geringer and colleagues nor Ramaswamy controlled for the effect of moderating factors such as firm size and leverage or for industry, and our significant control variables definitely appear to limit the effects of international diversity. We did regress performance on a nonlinear formulation for international diversity, but the quadratic term was never significant.

Our key concern, the moderating role of international diversity on the effects of product diversity on firm performance, is not established. Our full-sample regressions show an increase in the coefficients of the product diversity variables when their interaction with international diversity is added. These results suggest that the interaction with international diversity may exacerbate the performance effects of intermediate levels of product diversity (increase the up-and-down slopes of the curved regression line), in contrast to the results of Kim and colleagues (1989). Although hardly conclusive, this outcome is actually more in line with intuition than their results for high levels of diversity, although we do not infer performance improvement at low levels of product diversity, and the statistical significance of these slopes is low ($p < .05$). The lack of significant direct effects from the country scope main effect term and the interaction term may again arise from the inclusion of the control variables. Also, it is possible that the overall high multinationality of our sample hides the effects of international diversity that might appear in a broader sample.

Our equations have relatively low explanatory power, accounting for between 15 and 20 percent of the variance in the dependent variable. This is less than we would like, but is not atypical of such studies. Grant and coauthors (1988), despite using industry dummy variables, obtained similar $R^2$ values. Kim, Hwang, and Burgers (1989) explained less than 10 percent of the variance in any of their comparisons. Hoskisson and colleagues (1993) and Robins and Wiersema (1995) showed comparable levels of $R^2$ for studies of product diversification. A possible explanation for this is Rumelt’s (1991)
assertion that most performance variance is explained by business-level effects, followed by industry effects, with only a small portion of variance explained by firm effects. Schmalensee (1985) did not test business-level effects but attributed most performance variance to industry effects rather than firm effects. As we are working at the firm level, we perhaps should not expect more than some 20 percent of variance to be explained. We might have increased our $R^2$ marginally if we had used industry dummies, rather than a single industry variable, but this was not the main concern of this research. We have shown that industry growth does have a performance effect and that among firm-level variables size does not have an effect on ROS and leverage has a significant effect. This effect of debt ratio in particular is seldom addressed in previous studies.

**CONCLUSIONS**

In conclusion, we have provided strong corroborating evidence that performance is related to product diversity in a nonlinear manner, supporting a combined resource-based and transaction cost interpretation of the effect of product diversity. We have also provided some evidence that accounting performance in multinational firms is positively related to scope of international operations, but not to the commonly used measure of international intensity, sales by foreign subsidiaries. The previous success of this variable seems to disappear when control variables for industry growth and especially firm leverage are added. We provide at best limited evidence that international diversity moderates the performance effect of product diversity.

The study has limitations that restrict its generalizability but make our findings more notable, as the sample was rather homogeneous. First, the sample firms are all large U.S. manufacturing multinationals, excluding the study’s generalizability to small firms, U.S. domestic firms, or firms from other countries. Grant and colleagues (1988) performed similar tests on a U.K. sample, with similar results. Considering also the results of Geringer and colleagues (1989), the impact of international diversity on performance seems to be home-country or region dependent. A broader sample, in terms of size, international focus, or nationality, would be most interesting. For instance, these findings would probably not apply to Japanese firms, which generally have lower product diversification. Another important limitation is that this study was cross-sectional, suggesting that a timewise analysis would be a logical next step. Detailed analysis of structural type is beyond the scope of our study and is a distinct limitation of large-sample studies of secondary data. Bartlett and Ghoshal’s (1989) case studies suggest that how diversity is managed is at least as important as the degree of a multinational firm’s diversity. Finally, if Rumelt (1991) is correct about the relative importance of business and firm effects on performance, a study of international diversity at the business level would be most interesting and likely to explain a much higher percentage of performance variance.

Despite these limitations, we believe that we have taken a useful step in the analysis of diversity effects on performance. Both transaction cost and
resource-based theory suggest that excess product diversification may harm performance. We have shown that this is indeed the case for multinational firms. International diversity, as measured by scope of international operations, has a less significant linear effect on performance. This finding suggests that internationalization models may be correct about the ability of multinational firms to develop the internal capacity to manage widespread national subsidiaries through a gradualist approach. We should note, though, that American multinationals are generally less international than firms from smaller home markets, and a nonlinear effect may still appear at higher levels. Finally, all these statistical effects of international diversity are moderated by, and perhaps dominated by, the strategies and internal structures of individual firms or businesses. Our significant firm and industry control variables appear to limit the significance assigned to international diversity variables in previous studies. The incomplete models typical of such studies (as evidenced by their generally low $R^2$ values) may account for the instability of results noted in the introduction.

REFERENCES


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