

CORPORATE DIVERSIFICATION: THE IMPACT OF FOREIGN COMPETITION, INDUSTRY GLOBALIZATION, AND PRODUCT DIVERSIFICATION

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The globalization of markets and industries has fundamentally changed the competitive conditions facing firms. Yet, how globalization has influenced the international diversification strategies of firms is an issue largely overlooked in both the strategic management and international business literatures. This paper develops a theoretical framework to understand how industry globalization, foreign competition, and firm product diversification may influence a firm's choice of its degree and scope of international diversification. Utilizing a panel dataset of U.S. manufacturing firms for the period 1987–99, we provide the first empirical evidence that industry globalization and foreign-based competition are statistically significant factors explaining the degree and scope of international diversification by U.S. firms. Copyright © 2007 John Wiley & Sons, Ltd.

INTRODUCTION

One of the most significant changes in the world economy over the past two decades has been a growing globalization of markets and industries. Numerous forces have contributed to rising globalization, including reductions in multilateral and regional trade barriers (Krueger, 1995), reduced costs of international transport and communications (Hummels, 1999), and reform and greater global integration of capital markets (Sachs and Warner, 1995). The ongoing consequences of globalization include widespread industry rationalization and heightened competition at national, regional, and global levels as evidenced by significantly higher levels of foreign competition (OECD, 2003) and increases in both cross-border

mergers and acquisitions (UNCTAD, 1987–99) and the number of multinational firms.¹ Increasing vertical linkages, as production activities become more specialized and spatially dispersed,² have complemented the growing horizontal linkages among nations.

The ongoing processes of globalization, particularly changes in the competitive conditions facing firms as markets and industries globalize, are significant economic phenomena that can, like other phenomena that change a firm's business and competitive conditions, be expected to induce changes in corporate strategy. Such influences may in particular impact a firm's international diversification strategy, defined as the decision to expand

¹ The number of transnational companies (a parent company holding a 50% or more equity stake in an entity outside the country of the parent) was 7,276 in 1968; 37,700 in 1990; and 69,727 in 2004 (UNCTAD, various years).

² Trade flows reflecting such vertical linkages are estimated now to account for up to 30 percent of world exports (Hummels *et al.*, 1999; OECD, 2002a; Whichard and Lowe, 1995; Zeile, 1997, 2002).

Keywords: internationalization; globalization; foreign competition; corporate strategy

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the scope of a firm's business beyond its domestic market (Grant, 2005; Hitt, Hoskisson, and Kim, 1997). In fact, Buckley and Ghauri (2004: 81) recently suggested that the impact of industry globalization on the strategies of multinational firms represents the 'big unanswered question' for international business researchers. Yet, despite its acknowledged importance, prior research has largely neglected the role of industry globalization and associated environmental changes such as forces shaping firms' international diversification strategy.

Prior strategy research on international diversification has largely focused on performance implications (Bergsten, Horst, and Moran, 1978; Buhner, 1987; Capar and Kotabe, 2003; Denis, and Yost, 2002; Delios and Beamish, 1999; Doukas and Lang, 2003; Geringer, Tallman, and Olsen, 2000; Geringer, Beamish, and daCosta, 1989; Goerzen and Beamish, 2003; Grant, Jammie, and Thomas, 1988; Kim, Hwang, and Burgers, 1989; Lu and Beamish, 2004; Tallman and Li, 1996). While contributing to our understanding of the performance consequences of international expansion, this research has largely ignored the more fundamental question of what drives the degree or scope of a firm's international diversification. Even when research has considered this more fundamental question, the analysis has primarily focused on firm-specific drivers (Delios and Beamish, 1999; Sethi *et al.*, 2003) and not on *global* economic factors (e.g., global market integration and foreign competition) as influences shaping a firm's international diversification strategy. With the forces of globalization ubiquitous, this omission represents an important gap in the strategic management literature on international diversification strategy.

This paper addresses this gap in the literature by examining the role of environmental and firm-specific factors in shaping a firm's international diversification strategy. Specifically, we investigate how industry globalization, foreign competition in a firm's domestic market, and the extent of a firm's product diversification influence a firm's international diversification strategy; a set of relationships not previously examined. In doing so, our analysis also contributes more broadly to the corporate strategy literature by providing for the first time both a theoretical framework and a set of empirical results for understanding how firms may strategically evolve in response to changing global conditions.

In conducting our analysis, we concentrate on a firm's international diversification strategy in relation to the competitive and business conditions of its core business. This emphasis is motivated by the fact that, by virtue of its relative size and as the source of a firm's distinct capabilities, structural changes within a firm's core business industry arising from increased globalization and increased competitive rivalry engendered by foreign competition in a firm's domestic market are more likely to result in a strategic response by the managers who oversee the strategy of a firm.

Our empirical investigation is conducted in a panel dataset of U.S. firms covering the years 1987–99. Our use of panel data contrasts with most empirical research on international diversification that has relied on cross-section data for a single year—an approach that has come under increasing criticism in the empirical strategy literature (Bergh, 1995; Bowen and Wiersema, 1999). Importantly, our panel dataset comprises both internationally diversified and non-internationally diversified firms that, in addition to being a more representative dataset of firms, allows us to take account of the influence of our variables on both a firm's decision to be internationally diversified and, if internationally diversified, its degree and scope of international diversification. Overall, our research design, estimation methods, and analysis of results represent important methodological contributions to the domain of empirical strategy research.

THEORY AND HYPOTHESES

Foreign competition

The extent of foreign competition in a firm's core business in its domestic market is likely to influence a firm's international diversification strategy. Such foreign competition can take two forms: (1) imports of foreign-produced goods; and (2) sales by affiliates of foreign-owned companies that produce in a firm's domestic market. While both forms of foreign competition are likely to intensify competition in a firm's domestic market, competition from foreign-based firms is more likely to increase competitive rivalry since foreign-based firms can possess both country and firm-specific capabilities that differ substantially from those of domestic firms.

Numerous industry-level studies document the significant economic and competitive ramifications of increased foreign competition in a country's domestic markets (e.g., Caves, 1974, 1982, 1996; Chung, 2001a, 2001b; Driffeld and Munday, 2000). Competition from foreign firms introduces diverse and less familiar capabilities into an industry and can create a more dynamic and uncertain competitive environment (Ghoshal, 1987; Kogut, 1983). Increased competition from foreign firms may bring about changes in the rate of technological developments in an industry (Caves, 1974, 1996; Scherer and Huh, 1992) and as a result, may lead to greater pressure to increase efficiency to remain competitive (Caves, 1996; Chung, 2001a, 2001b; Driffeld and Munday, 2000) since foreign firms are likely to be leveraging specific advantages (Caves, 1971). Increased foreign competition in a firm's domestic market may also decrease industry price-cost (profit) margins (Chung, 2001b; Domowitz, Hubbard, and Petersen, 1986; Ghosal, 2002; Katic and Petersen, 1995). Falling industry profit margins, rationalization of production, and pressures for greater efficiency and technological developments all provide evidence that foreign competition in the firm's domestic market may significantly intensify competition at the industry level (Tybout, 2001).

The influence of foreign competition in the domestic market on firms' international diversification strategy operates on two levels. First, foreign competition in the domestic market forces firms to become more competitive if they are to successfully meet the challenges of foreign rivals. For example, at the firm level, competition from low-wage countries has been found to induce U.S. firms to increase the capital intensity of their U.S.-based plants (Bernard, Jensen, and Schott, 2006). Similarly, increased foreign presence in an industry has been found to increase productivity and efficiency (Chung, 2001b) and to increase the comparative advantage of the domestic industry (Driffeld and Munday, 2000). Foreign competition, by raising the intensity of competition, can also increase domestic productivity by forcing marginal firms out of the industry (Caves, 1996). Domestic firms that successfully meet the challenges of increased foreign competition in their domestic market will also have demonstrated the possibility that they can compete successfully against foreign rivals outside their domestic market, and hence may also be more capable of operating and competing at a global

level. If so, then the extent of foreign competition in an industry may be indicative of a set of domestic firms likely to have greater international diversification.

Second, if competition from foreign firms challenges domestic firms to become more competitive at a global level, then domestic firms may choose to strategically engage foreign rivals in global markets. Meeting foreign competition in the global marketplace requires a domestic firm to seek competitive advantages through global scale and scope economies. In addition, increased international diversification may arise if domestic firms expand their activities abroad in order to offset any location-specific advantages enjoyed by their foreign-based rivals. In this context, the literature on foreign direct investment (FDI) has found that increased levels of foreign competition in a market lead to higher levels of FDI by domestic firms (Sethi *et al.*, 2003).

Together, these influences lead us to expect that a higher level of foreign competition in a firm's core business industry would motivate the managers of the firm to increase the firm's international diversification.

Hypothesis 1: The degree and scope of firm international diversification will be positively related to the level of foreign competition in the domestic market.

Industry globalization

The ongoing globalization of markets and industries is a significant economic phenomenon that has fundamentally changed the competitive conditions facing firms, and is therefore likely to have a significant impact on firms' international diversification strategy. Industry globalization is a process characterized by growing linkages among national markets in terms of consumers, production activities of firms, and the extent of the relevant market in which firms compete (OECD, 2002b). A global industry is one in which domestic markets are integrated across national boundaries, where competition among firms takes place on a worldwide basis, and where a firm's competitive position in one country is affected by its position in other countries (Porter, 1986, 1998).

Research documents how firms in an industry shift from operating and competing in local domestic arenas to operating and competing in a worldwide market (Bartlett and Ghoshal, 1989; Dunning,

1993; Johansson and Yip, 1994). Key elements indicating an industry's evolution toward becoming more global include standardization of products and services due to homogenization of consumer tastes, and the development of global scale economies in manufacturing (e.g., automotive) and in research and development (R&D) (e.g., pharmaceutical). Standardization of products across markets permits uniform branding and advertising that can result in marketing and product-based economies of scale (Levitt, 1983; Johansson and Yip, 1994) whereas global scale economies in manufacturing can drive rationalization of manufacturing and of R&D (Krugman, 1980; Hout, Porter, and Rudden, 1982; Porter, 1986, 1998).

Evidence of growing demand-side linkages among national markets that characterize the extent of an industry's globalization can be captured by output measures such as the volume of trade (exports plus imports) relative to industry sales (Morrison and Roth, 1992). Markets are also increasingly linked by supply-side production relationships, with production processes evolving into vertical chains of activities that extend over many countries, with different countries specializing in a particular stage of the production sequence (Hummels, Ishii, and Yi, 1999). The extent of these global links and integration within an industry can be captured by the level of intra-industry trade in an industry (Kobrin, 1991).

Globalization of an industry provides opportunities for an expansion of both sales and profit, but it also poses significant threats; firms must achieve global scale or scope economies to effectively compete with other global players. The pressures arising from globalization may therefore fundamentally transform how competitors in an industry perceive, and compete in, the global marketplace. In the face of rising globalization, managers are forced to reevaluate their competitive options in a more holistic manner, and to consider expansion overseas as a legitimate strategic alternative. It is perhaps not surprising that the more global competitive thinking of management has been both a key driver, and a key outcome, of industry globalization (Bartlett and Ghoshal, 1989). Therefore, as the extent of globalization in a firm's core business industry rises, international expansion is more likely to become a strategic priority of the firm.

As industry globalization rises, firms adopting a more international strategy can gain competitive advantages to better compete on a global

level by exploiting location differences in national resource endowments (Kogut, 1983), leveraging strategic resources, and achieving economies of scope across markets. Interregional differences in factor costs may necessitate a complete reorganization of the firm's value chain activities, including where to locate different activities as well as reevaluating whether certain activities should be undertaken internally or outsourced (Kogut, 1983; Porter, 1986), while economies of scale in manufacturing and in R&D can substantially reduce costs for internationally oriented firms. Similarly, a convergence in buyer tastes offers an opportunity to gain scale advantages from leveraging product development, brand name, and goodwill across a larger customer base. Empirical evidence indicates that firms do respond to industry globalization drivers, especially market and cost drivers, by adopting more global corporate strategies (Johansson and Yip, 1994). We would therefore expect that a higher level of industry globalization in a firm's core business would motivate the managers of the firm to increase the firm's international diversification.

Hypothesis 2a: The degree and scope of firm international diversification will be positively related to the level of industry globalization.

The magnitude of the relationship between international diversification and industry globalization in a firm's core business industry is likely to vary with the nature of the competitive conditions in a firm's domestic market. Specifically, a firm whose core business is located in an industry faced with a high level of import competition is likely to face a more intense competitive environment as firms vie for resources and competitive position (Grant, 1987; Porter, 1980). In this case, the increase in a firm's international diversification induced by rising industry globalization is likely to be greater for two reasons. First, the firm may see limited prospects for growth within its domestic market and, as global markets expand, it would seek additional growth in international markets. Second, if foreign-based rivals enjoy location-based advantages (e.g., lower labor costs), the firm may choose to counter such advantages by undertaking production abroad (e.g., in lower labor cost regions). Given this, we expect that the higher the level of foreign competition in a firm's core business, the larger will be the effect of industry globalization.

in motivating a firm's managers to increase international diversification.

Hypothesis 2b: The higher the level of foreign competition in the domestic market, the larger will be the increase in a firm's degree and scope of international diversification as industry globalization rises.

Product diversification

The level of a firm's product diversification can be expected to influence the degree and scope of a firm's international diversification. While this assertion is perhaps without debate, the fundamental question is whether these two modes of expansion by the firm are substitutes, and therefore represent a trade-off for the firm, or are complementary, in that they reinforce each other and can therefore be pursued simultaneously by the firm. Both the resource-based view (RBV) and transaction cost economics (TCE) theories suggest a substitute relationship.

Resource-based theory posits that the opportunity to leverage the firm's excess resources into new markets is the basis and motive for corporate strategic choice regarding expansion via product or international diversification (Penrose, 1959; Peteraf, 1993; Teece, 1982; Wernerfelt, 1984). However, the amount of resources available to a firm is limited and, especially in the case of managerial attention, cannot be readily augmented. For example, researchers have found that with regard to investment decisions there are trade-offs in that firms are not limitless in terms of their ability to pursue new investment opportunities (Thomas, 2004). Limits on a firm's key resources therefore suggest that past decisions to expand a firm's business portfolio by product diversification place a real constraint on its ability to subsequently undertake geographic expansion.

Transaction cost economics (Coase, 1938; Williamson, 1985) posits that an expansion of corporate scope involves a comparison of the relative costs of negotiating, monitoring, and enforcing contracts associated with carrying out the transactions internally (hierarchical) vs. externally (via a market). Based on TCE, researchers have posited that higher levels of diversification (product or geographic) impose additional costs of coordination and control over a firm's activities such that 'the firm is constantly trading off

the economic benefits associated with a corporate strategy against the bureaucratic costs of implementing that strategy' (Jones and Hill, 1988: 165). Given that expansion by a firm into new product and/or geographic markets will require greater coordination and control by management over the activities of the firm (Penrose, 1959), it follows that past decisions to expand a firm's business portfolio by product diversification will raise the costs of subsequent attempts to expand geographically.

Both RBV and TCE therefore suggest that past decisions regarding a firm's level of product and geographic diversification will influence subsequent decisions and, moreover, that the nature of the relationship involves a trade-off between these two modes of expansion. Indeed, prior empirical research indicates that firms do appear to face a trade-off when seeking to expand via product or geographic diversification, and that pursuing both types of diversification leads to subpar performance (Delios and Beamish, 1999; Geringer *et al.*, 1989; Kim *et al.*, 1989; Tallman and Li, 1996). Research has also found evidence of significant negative synergies and a misallocation of management time, resulting in a negative stock market reaction to these types of foreign direct investment announcements (Doukas and Lang, 2003).

That product diversification and geographic diversification are conflicting expansion strategies within the firm implies two paths, one indirect and one direct, by which a firm's level of product diversification may influence its international diversification strategy. Indirectly, a trade-off between product and geographic expansion implies that the level of product diversification would moderate the influence of any factors (e.g., higher industry globalization) driving international diversification strategy. Firms with higher levels of product diversification are more likely to face resource and managerial constraints that can limit their ability to develop global competitive advantages and to thus compete internationally (Wan and Hoskisson, 2003). We therefore expect that a higher level of product diversification would weaken the positive effect of higher industry globalization on a firm's degree and scope of international diversification.

Hypothesis 2c: The higher the level of firm product diversification, the smaller will be the

increase in a firm's degree and scope of international diversification as industry globalization rises.

A firm's level of product diversification is also expected to directly influence its international diversification strategy. Specifically, higher levels of product diversification necessitate higher levels of managerial coordination and control and also impose constraints on the amount of managerial attention and firm resources available to the firm to expand geographically. Conversely, firms with more focused business portfolios are less likely to face such limits. Since higher levels of product diversification can constrain a firm's ability to pursue geographic expansion, we expect international diversification by the firm to be negatively related to its level of product diversification.

Hypothesis 3: The degree and scope of firm international diversification will be negatively related to the level of firm product diversification.

METHODS

Model specification

Our theory proposes that the evolving industry conditions associated with globalization are important and significant drivers of managers' decisions to expand the geographic scope of the firm. In this regard, our hypotheses implicitly assume that the influence of these drivers is the same regardless of the level of management at which such decisions are made. Recent business events highlight that companies can vary in how they approach global expansion, and that even within the same company the management level at which such decisions are made can vary. For example, Barclays' CEO John Varley has a long-held ambition that the company makes half of its profits outside its U.K. home base. Whether it is investment banking in Russia, mortgages in Italy, wealth management services in the United States, or fund management in Japan, the company has over time developed a significant international presence. Recently, the recruitment of Frits Seeger as head of Barclays' global retail banking operations has led to Barclays expanding its retail banking business into Africa, southern Europe, and the Middle East. For Barclays, executives at multiple levels have been instrumental in decisions to undertake overseas expansion.

Recognizing that management at both the corporate and business unit level are likely to be involved in decisions to expand the geographic scope of the firm, our model includes variables to capture industry-specific characteristics that are likely to lead managers 'on the ground' to suggest and implement international expansion. At the business unit level, managers are aware of the business and competitive conditions of their industry as exemplified by its rate of growth, capital intensity, R&D intensity, and degree of scale economies. Managers are also aware of foreign competition in their domestic market, the overall rate of industry globalization, and the growing opportunities to trade. To capture such influences our model therefore includes R&D intensity, world industry growth, capital intensity, economies of scale, and world industry trade barriers as industry controls.

In addition to their potential role in influencing managers decisions regarding international expansion, these industry-level controls also serve to capture sources of comparative advantage identified in the international trade literature (e.g., Baldwin, 1971; Helpman and Krugman, 1985; Leamer, 1984; Ohlin, 1935; Stern and Maskus, 1981) and the literature on the multinational enterprise (MNE) (Buckley and Casson, 1976; Caves, 1982; Rugman, 1979; Teece, 1985). The MNE literature further indicates the importance of controlling for the presence of intangible assets (e.g., R&D) since the opportunity to leverage intangible assets across international markets provides one of the main motivations for international expansion (Buckley and Casson, 1976; Caves, 1982; Rugman, 1979; Teece, 1985, 1986). Moreover, such assets enable firms to overcome the *liability of foreignness* when operating in foreign markets (Caves, 1996). Finally, the strategic management literature also emphasizes that heterogeneity in resource endowments across firms implies that firms have specific advantages they can leverage across geographic boundaries to provide firm-level competitive advantages (Barney, 1991; Mahoney and Pandian, 1992; Penrose, 1959). While prior empirical research has utilized both R&D and advertising intensity measures to capture the existence of intangible assets in an industry, data limitations constrained us to using industry R&D intensity to capture the presence of such assets.

At the corporate level, the availability of resources influences how corporate management facilitates or constrains geographic expansion, with

overall firm profitability providing a means for international expansion (Buckley and Ghauri, 2004; Lu and Beamish, 2004; Makhija, Kim, and Williamson, 1997; Morrison and Roth, 1992). To capture these influences we include firm size and firm financial performance as firm-level controls in our model.

To empirically investigate the influence of foreign competition, industry globalization, and the level of product diversification on a firm's international diversification strategy, our model specifies the degree or scope of a firm's international diversification in relation to the level of these three explanatory variables *lagged* one period. Lagged values are used since we expect a firm's current international diversification strategy to be influenced by competitive and firm-specific conditions in a prior period.

Finally, to study the potential moderating influence of foreign competition and firm product diversification on the relationship between a firm's international diversification and industry globalization, our model also includes two interaction terms: one between import competition and industry globalization and one between firm product diversification and industry globalization. The full model can be written:

Firm International Diversification

$$\begin{aligned}
 \text{Firm International Diversification} = & \beta_0 + \beta_1(\text{Lagged Foreign Competition}) \\
 & + \beta_2(\text{Lagged Industry Globalization}) \\
 & + \beta_3(\text{Lagged Firm Product Diversification}) \\
 & + \beta_4(\text{Firm Size}) \\
 & + \beta_5(\text{Lagged Firm Performance}) \\
 & + \beta_6(\text{Industry R&D Intensity}) \\
 & + \beta_7(\text{Industry Capital Intensity}) \\
 & + \beta_8(\text{Industry Economies of Scale}) \\
 & + \beta_9(\text{World Industry Growth}) \\
 & + \beta_{10}(\text{World Industry Trade Barriers}) \\
 & + \beta_{11}(\text{Lagged Industry Globalization}) \\
 & \times \text{Lagged Foreign Competition} \\
 & + \beta_{12}(\text{Lagged Industry Globalization}) \\
 & \times \text{Lagged Firm Product Diversification} + \varepsilon
 \end{aligned}$$

The partial model with no interactions is obtained by setting β_{11} and β_{12} to zero in the above equation.³

Data and estimation

Our dataset is an unbalanced panel of U.S. firms over the period 1987–99. The dataset contains 14,784 observations with varying numbers of firms in each year.⁴ Our focus on U.S. firms reflects constraints on sourcing line of business and foreign sales data for non-U.S. firms. Limitations in sourcing data for world industry trade volume and world industry trade barriers prevented us from extending the sample beyond 1999. However, data limitations aside, the time frame of our study is relevant since U.S. firms faced dramatic increases in foreign competition and heightened international competition from industry globalization during our sample period (Sachs and Warner, 1995). For example, for the United States, the OECD's 'index of exposure to international competition' rose almost 78 percent between 1985 and 1999 (rising from 18.9% in 1985 to 33.6% in 1999).⁵ Similarly, imports as a share of total U.S. purchases of manufactured goods rose 70 percent over the same time period (from 12.3% in 1985 to 21% in 1999) (OECD, 2002a; 2003).⁶

One concern regarding our analysis is whether business conditions in a firm's core business industry—the focus of our analysis—are indicative of the business conditions managers at the corporate level confront when making decisions regarding a firm's geographic expansion. Most of our sample (71%) represents single-business firms for whom

³ Our models initially included a set of time dummy variables to capture movement in international diversification arising from potentially omitted variables that evolve over time. However, in subsequent estimation these time dummies were not statistically significant and were therefore dropped.

⁴ The number of firms in each year (percentage of diversified firms in parenthesis): 1988: 1,018 (33.9%); 1989: 1,055 (32.5%); 1990: 1,110 (32%); 1991: 1,179 (30%); 1992: 1,275 (27.9%); 1993: 1,416 (25.8%); 1994: 1,422 (25%); 1995: 1,419 (24.7%); 1996: 1,410 (23.8%); 1997: 1,345 (23.9%); 1998: 1,234 (34.9%); 1999: 901 (41.8%).

⁵ This measure indicates the fraction of domestic output that, whether exported or sold domestically, competes with production by foreign competitors (OECD, 2002a).

⁶ Part of the growth in foreign competition to U.S. firms over this period reflected shifts in U.S. trade policy toward increased support for the GATT, as well as the completion of preferential trading arrangements such as the North American Free Trade Agreement (NAFTA) (Congressional Budget Office, 1987; Krueger, 1995).

the corporate and business unit levels are the same. The remaining portion of the sample (29%) is diversified firms among which the mean core business size is 63 percent. In total, 93 percent of the firms in our dataset are either single-business firms or diversified firms whose core business represents 50 percent or more of the firm's overall sales. Thus, for most companies in our dataset, the competitive and economic conditions associated with a firm's core business industry are indicative of the conditions managers confront when making decisions regarding the firm's international diversification strategy. Hence, our measure of firm international diversification captures to a large extent also the geographic expansion of the firm in terms of its core business, and it is therefore consistent with the level at which we measure the business and competitive conditions facing the managers of the firm.

Our models are estimated using the TOBIT procedure (Greene, 2003) since about 57 percent (8,457) of the observations are firms with no international diversification and for whom the dependent variable takes the value zero. In a preliminary analysis, we examined for potential heteroscedasticity assuming a general form in which the disturbance variance is modeled as an exponential function of the explanatory variables (Greene, 2003). Likelihood ratio tests (not reported) rejected the hypothesis of homoscedasticity for each model and indicated that the disturbance variance was only systematically related to three firm-level variables: firm product diversification, firm size, and firm performance. Our heteroscedasticity specification therefore used only these three variables.

In the TOBIT framework, the conditional mean of the dependent variable is a nonlinear function of the explanatory variables (Bowen and Wiersema, 2004). This nonlinearity creates an issue for testing moderator Hypotheses 2b and 2c since the estimated coefficient on an interaction variable is not the 'true' interaction coefficient (Ai and Norton, 2003). The true interaction coefficient is instead a function of all model variables. Tests of a moderator hypothesis in the TOBIT framework therefore requires that one compute the value of the 'true' interaction coefficient, test for its statistical significance, and examine its sign at different values of the moderator variable. If the true interaction coefficient is statistically significant, variation in the value of the total marginal effect

over values of the moderator variable indicates the effect of the moderator variable on the relationship between the dependent and explanatory variable.

Main measures and data sources

Firm international diversification

International diversification refers to a firm's expansion beyond its domestic market into other regions or countries (Ghoshal, 1987) or the extent of a firm's international operations (Delios and Beamish, 1999). Since the nature of a firm's international diversification can be multifaceted, we examined prior strategy and international business research for measures to operationalize the concept of international diversification. The most commonly used measure is the 'foreign sales ratio,' defined as a firm's foreign sales divided by its total sales (Capar and Kotabe, 2003; Geringer *et al.*, 1989, 2000; Grant *et al.*, 1988; Tallman and Li, 1996). Other firm-level measures appearing in the literature include the entropy of a firm's sales across geographic market regions (Hitt *et al.*, 1997), a count of the number of countries in which a firm sells (Tallman and Li, 1996), the ratio of exports to total sales, and the ratio of foreign to total employees (Kim *et al.*, 1989). Many of these measures have significant limitations in terms of capturing the extent of a firm's overseas expansion. For example, neither the foreign employee ratio nor the foreign asset ratio capture a firm's export sales, thus omitting a significant dimension of a firm's international activities; moreover, these ratios vary with the nature of the industry and firm. The export-to-sales ratio fails to capture foreign subsidiary activities, while the most simplistic measure—country count—ignores the relative importance of a firm's international activities.

Based on our review of measures used, we chose to operationalize a firm's international diversification in terms of both the degree and scope of its international sales activity. We use the foreign sales ratio to capture the degree of a firm's international diversification and, following Hitt *et al.* (1997), we use an entropy measure of a firm's sales shares in different geographic areas to capture the scope of a firm's international diversification.

Annual data on firms' foreign sales were taken from COMPUSTAT's geographic segment data-

base. In this database, export sales are not consistently reported separately from sales made by a firm's foreign-based subsidiaries. Hence, the foreign sales ratio includes both types of foreign sales activity. Also, like Hitt *et al.* (1997), we were only able to identify four comparable geographic areas to capture the geographic distribution of a firm's sales: Domestic (United States), Asia and Pacific, Europe, and a residual 'other' region, since the COMPUSTAT database limits the total number of geographic regions a firm can report.

Foreign competition

Foreign competition in a market consists of imported goods and goods produced and sold domestically by the affiliates of foreign-owned companies (i.e., foreign domestic production). A lack of detailed industry data after 1994 on foreign domestic production in the United States constrained us to capture foreign competition solely in terms of import competition.

Import competition is measured by the ratio of imports to total domestic consumption in the four-digit SIC core industry of the firm. Annual data on import competition by four-digit SIC were graciously provided by Peter Schott (Bernard *et al.*, 2006).

Industry globalization

It has been argued that objective and comprehensive measures of industry globalization should capture both the extent of an industry's international linkages as well as the extent of integration of firms' value-added activities within an industry across national boundaries. Since no single measure can capture both these dimensions of industry globalization, we use two core industry level measures: the volume of world trade relative to world sales to capture the extent of an industry's international linkages, and the level of intra-industry trade to capture the degree of global integration of value-added activities.

World industry trade volume. Prior research has used industry trade volume (exports plus imports) relative to industry sales to capture the extent of an industry's international trade linkages (e.g., Morrison and Roth, 1992). However, prior studies have used only national-level data (e.g., U.S. trade flows and U.S. production) which imparts a bias

if one's interest is to capture the extent of an industry's worldwide linkages. We use instead a world measure of industry trade volume calculated using values of world trade and world production:

$$\frac{\text{World Industry Imports}}{\text{Trade Volume}} = \frac{\text{World Industry Imports}}{\text{World Industry Sales}}$$

Since world imports equal world exports, our measure is equivalent to world exports plus world imports divided by world industry sales. Our measure is therefore similar to, but contrasts with, the trade volume measure used in prior research that relies only on national level trade and sales data (Morrison and Roth, 1992). Annual data on world industry sales and world industry imports were derived from the World Bank's Trade and Production database (Nicita and Olarreaga, 2001).

Intra-industry trade. Following prior research (Kobrin, 1991), we capture the degree of international dispersion of value-added activities within an industry by the extent of intra-industry trade in an industry, the latter measured by the index of intra-industry trade first developed by Grubel and Lloyd (1975):

$$\frac{\text{Intra-industry Trade}}{\text{Trade}} = \frac{[(E + I) - \text{Absolute Value } (E - I)]}{(E + I)}$$

where E = Exports and I = Imports.

This intra-industry trade measure indicates the fraction of total trade volume in an industry that is 'matching' or two-way trade, and thus captures the two-way exchange of goods within an industry category (Greenaway and Milner, 1986). Values of the index range from zero to one, with higher values indicative of industries having greater global integration of value-added activities across national boundaries. Values of the intra-industry trade measure were calculated for each four-digit SIC industry using annual data on U.S. exports and U.S. imports taken from the United Nations Trade Data Bank.

Firm product diversification

Jacquemin and Berry's (1979) entropy measure of diversification was used to measure the extent of diversity in a firm's lines of business and was computed using data on the firm's sales in each of

10 possible four-digit SIC businesses as reported by the COMPUSTAT Line of Business database.

Control variables

The Appendix provides definitions and sources of data for the firm and core industry-level control variables. A firm's core business is commonly defined as the business segment that generates the largest revenue for the firm (Rumelt, 1974). We therefore defined a firm's core business industry as the four-digit SIC industry of the business segment that generated the largest revenue for the firm in 1987. The identity of a firm's core industry is held fixed over the time period of our study.

RESULTS

Table 1 presents the means, standard deviations, and correlations for all variables based on the dataset of 14,784 observations. Table 2 presents the heteroscedasticity corrected TOBIT results of estimating the partial and full models for both the degree and scope of firm international diversification. For each measure of international diversification, the chi-square statistic indicates strong significance ($p < 0.01$) of each model over the simple model that includes only a constant. The estimated coefficients in each model are directly comparable since all explanatory variables were standardized to have a mean of zero and a variance equal to one prior to estimation.

Models 1 and 3 in Table 2 show the estimation results for each measure of firm international diversification in relation to lagged foreign competition, lagged industry globalization, lagged firm product diversification, and the firm and industry control variables. Firm international diversification, as measured by the foreign sales ratio (Model 1) and by geographic entropy (Model 3), is positive and significantly related to lagged import competition. Higher levels of foreign competition in a firm's domestic core industry lead to greater international diversification by the firm, supporting Hypothesis 1, that the degree and scope of firm international diversification will be positively related to the level of foreign competition in the domestic market.

Firm international diversification, as measured by the foreign sales ratio (Model 1) and by geographic entropy (Model 3), is positive and significantly related to both lagged world industry

trade volume and lagged intra-industry trade. A higher level of industry globalization in a firm's core industry, in terms of a higher volume of world trade or higher intra-industry trade, leads to greater international diversification by the firm. These results support Hypothesis 2a, that the degree and scope of firm international diversification will be positively related to the level of industry globalization.

The results in Models 1 and 3 also indicate that firm international diversification, in terms of the foreign sales ratio and geographic entropy, is negative and significantly related to lagged firm product diversification. These results support Hypothesis 3, that the degree and scope of firm international diversification will be negatively related to the level of firm product diversification.

Regarding the firm-level control variables, firm size and firm performance are significant and positively related to firm international diversification as anticipated. For the core industry control variables, R&D intensity, economies of scale, and world industry growth are each significant and positively related to firm international diversification as anticipated, while world industry trade barriers and industry capital intensity are each significant and negatively related to firm international diversification as anticipated.

To investigate whether our use of core industry variables adequately captures the competitive and business conditions facing diversified firms, we estimated Model 1 separately for diversified firms and single-business firms. As can be seen in the last two columns of Table 2, the estimated direction and significance of the explanatory and control variables is the same for each type of firm. Moreover, the estimated direction and significance for each variable is the same as that obtained for Model 1 based on the combined sample of firms (the first column of results in Table 2). These results strongly support our contention that a firm's core industry, and the competitive and economic conditions in that industry, is appropriate and relevant for capturing the competitive and economic conditions that may lead managers to expand the geographic scope of the firm.

Models 2 and 4 in Table 2 show the estimation results for each measure of firm international diversification in relation to lagged foreign competition, lagged industry globalization, and lagged firm product diversification, firm and industry control variables, and the interaction variables between

Table 1. Descriptive statistics and correlation matrix

Variable ^a	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12
1. Firm International Diversification (Foreign Sales Ratio)	0.126	0.190	1.000											
2. Firm International Diversification (Geographic Entropy)	0.281	0.379	0.906	1.000										
3. Import Competition	0.202	0.202	0.087	0.093	1.000									
4. World Industry Trade Volume	0.378	0.173	0.132	0.134	0.420	1.000								
5. Intra-industry Trade	0.699	0.216	0.041	0.044	-0.010	0.116	1.000							
6. Firm Product Diversification	0.209	0.379	0.088	0.146	-0.133	-0.166	-0.133	1.000						
7. Firm Size	4.448	2.453	0.373	0.473	-0.040	-0.116	-0.118	0.412	1.000					
8. Firm Performance	0.020	0.430	0.094	0.138	0.004	-0.037	-0.014	0.115	0.393	1.000				
9. Industry R&D Intensity	5.592	4.892	0.024	-0.005	-0.030	0.201	0.204	-0.197	-0.271	-0.153	1.000			
10. Industry Capital Intensity	105.271	129.606	0.042	0.045	-0.050	-0.159	-0.103	0.155	0.289	0.025	-0.109	1.000		
11. Industry Economies of Scale	0.158	0.200	0.126	0.140	0.151	0.486	0.024	-0.042	0.054	-0.008	0.074	0.029	1.000	
12. World Industry Growth	0.020	0.067	-0.025	-0.031	-0.046	-0.228	0.049	0.018	-0.082	-0.000	0.115	-0.340	1.000	
13. World Industry Trade Barriers	0.035	0.158	-0.045	-0.044	0.010	0.014	-0.049	-0.032	0.032	0.012	-0.133	-0.067	0.081	-0.344

^a n = 14,784

Correlations whose absolute value exceeds 0.0162 are significantly different from zero at the 5% level of significance.

^a All industry variables correspond to the core business industry of a firm.

Table 2. TOBIT results for predicting firm international diversification

Variable ^a	Foreign sales ratio				Geographic entropy		Foreign sales ratio ^d	
	Model 1	Model 2	Model 3	Model 4	Diversified business firms	Single business firms	Diversified business firms	Single business firms
Import Competition (lagged)	0.025***	0.022***	0.054***	0.049***	0.019***	0.029***	0.029***	0.029***
World Industry Trade Volume (lagged)	0.039***	0.046***	0.077***	0.087***	0.025***	0.046***	0.026***	0.046***
Intra-industry Trade (lagged)	0.024***	0.027***	0.052***	0.058***	0.026***	0.022***	0.026***	0.022***
Firm Product Diversification (lagged)	-0.026***	-0.029***	-0.043***	-0.050***	-0.009**	—	—	—
Firm Size	0.270***	0.271***	0.571***	0.574***	0.197***	0.336***	0.042***	0.016*
Lagged Firm Performance (lagged)	0.043***	0.043***	0.049***	0.047***	0.042***	0.042***	0.015***	0.031***
Industry R&D Intensity	0.018***	0.019***	0.035***	0.035***	0.015***	0.015***	0.015***	0.015***
Industry Capital Intensity	-0.043***	-0.043***	-0.103***	-0.104***	-0.019***	-0.083***	-0.019***	-0.019***
Industry Economies of Scale	0.020***	0.021***	0.043***	0.044***	0.021***	0.019***	0.021***	0.019***
World Industry Growth	0.012***	0.011***	0.025***	0.024***	0.010***	0.011***	0.010***	0.011***
World Industry Trade Barriers	-0.036***	-0.036***	-0.078***	-0.079***	-0.014***	-0.053***	-0.014***	-0.053***
World Industry Trade Volume \times Import Competition		0.007*			0.012			
Intra-Industry Trade \times Import Competition		0.002			0.003			
World Industry Trade Volume \times Product Diversification		-0.014***			-0.023***			
Intra-Industry Trade \times Product Diversification	-0.001				-0.006			
Intercept	-0.101***	-0.108***	-0.140***	-0.152***	-0.061***	-0.113***	-0.061***	-0.113***
Pseudo R^2	0.307	0.309	0.212	0.213	0.336	0.296	0.336	0.296
Log-likelihood	-5533.3	-5515.9	-9851.2	-9838.1	-1291.8	-4074.6	-1291.8	-4074.6
Chi-square statistic for overall model significance ^b	4144.2***	4196.1***	4708.6***	4749.3***	1175.5***	3032.8***	1175.5***	3032.8***
Chi-square statistic for significance of interactions ^c		25.33***	25.80*	16.80*				

n = 14,784; * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

^a All industry variables correspond to the core business industry of a firm.

^b Test of the model against the model that includes only the constant.

^c Test of the full model against the partial model with the four interaction variables excluded.

^d *n* = 10,494 for diversified business firms; *n* = 4,290 for single-business firms.

Table 3. Analysis of the total marginal effect of a change in industry globalization and moderator variables on firm international diversification

Moderator variable	Level of moderator	Value of moderator ^a	Total marginal effect ^b			
			Foreign sales ratio		Geographic entropy	
			World industry trade volume	Intra-industry trade	World industry trade volume	Intra-industry trade
Import Competition	Low	0.009	0.013***	0.009***	0.028***	0.021***
	Mean	0.202	0.017***	0.010***	0.035***	0.024***
	High	0.404	0.021***	0.012***	0.043***	0.027***
Firm Product Diversification	Low	0.0 ^c	0.024***	0.011***	0.053***	0.028***
	Mean	0.209	0.017***	0.010***	0.040***	0.024***
	High	0.588	0.011***	0.009***	0.029***	0.020***

* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$

^a For each moderator, its low (high) value is its value one standard deviation below (above) its sample mean as suggested by Jaccard, Turrisi, and Wan (1990).

^b All independent variables are measured in standardized units. The total marginal effect is calculated as the effect of a one standard deviation increase in the indicated globalization variable on firm international diversification at the given value of the moderator variable.

^c The computed value was negative, but is indicated here as a zero value.

import competition and industry globalization, and between firm product diversification and industry globalization. For each model, the chi-square statistic testing joint significance of the interaction variables indicates strong significance for the full model (Models 2 and 4) compared to the partial models (Model 1 and 3) that exclude the interaction variables. The individual significance of the estimated coefficients on the interactions between import competition and world industry trade volume and firm product diversification and world industry trade volume further indicates the importance of these interaction variables for explaining the variation in the degree and scope of firm international diversification.

To test moderator Hypotheses 2b and 2c, values of the true interaction coefficients associated with Models 2 and 4 were calculated, and their significance assessed, over the full range of values taken by each moderator in our dataset. For the interaction between lagged import competition and world industry trade volume, all values of the true interaction coefficient were found to be consistently positive and significant. Similarly, for the interaction between firm product diversification and world industry trade volume, all values of the interaction coefficient were found to be consistently negative and significant. Thus, both import competition and firm product diversification were significant moderators of the relationship between world

industry trade volume and the degree and scope of firm international diversification. For the interaction between lagged import competition and intra-industry trade, and between firm product diversification and intra-industry trade, the values for each true interaction coefficient were not statistically significant over the range of values of the moderator. Therefore, neither import competition nor firm product diversification was found to be significant moderators of industry globalization as measured by intra-industry trade.

To examine the effect of the moderator variable, Table 3 shows values of the total marginal effect for each industry globalization measure on both measures of firm international diversification at a low, mean, and high value of each moderator variable. As shown, the total marginal effect of an increase in world industry trade volume on the degree and scope of firm international diversification is positive and significant at the low, mean, and high value of import competition and the effect of an increase in world industry trade volume is greater the higher is the level of import competition in a firm's core business industry. These findings support Hypothesis 2b, that the higher the level of foreign competition in the domestic market, the larger will be the increase in a firm's degree and scope of international diversification as industry globalization (as measured by world industry trade volume) rises.

The total marginal effect of an increase in world industry trade volume on the degree and scope of firm international diversification is significant and positive at the low, mean, and high values of firm product diversification, and the effect of an increase in world industry trade volume falls with higher values of firm product diversification. These findings support Hypothesis 2c, that the higher the level of firm product diversification, the smaller will be the increase in a firm's degree and scope of international diversification as industry globalization (as measured by world industry trade volume) rises.

As noted previously, no significant moderating effects were found for import competition or firm product diversification with respect to industry globalization measured by intra-industry trade. Therefore, in Table 3, the value of the total marginal effect associated with intra-industry trade at different values of each moderator variable only reflects the direct influence of each moderator in our models.

To summarize, our results indicate that the moderator Hypothesis 2b and 2c are supported for industry globalization measured by world industry trade volume, but are not supported for industry globalization measured by intra-industry trade.

DISCUSSION AND CONCLUSION

This paper has developed a theoretical framework to understand how changing global business conditions, as reflected by the growing globalization of markets and industries, can influence a firm's international diversification. Our empirical results, derived in a panel dataset of U.S. firms spanning the period 1987–99, provide strong evidence that a firm whose core business industry is characterized by increased market openness and greater global market linkages is likely to have both a higher degree and a greater scope of international diversification. Consistent with our theoretical framework, our empirical results also indicate that both the extent of foreign competition in a firm's domestic core industry, and the extent of a firm's product diversification, moderate the relationship between the degree and scope of a firm's international diversification and industry globalization when the latter reflects the extent of product market linkages among nations. Specifically, higher levels of import competition in a firm's

core industry reinforce the positive effect of rising industry globalization in terms of rising product market linkages, while the extent of a firm's product diversification reduces the positive effect that rising industry globalization, in terms of rising product market linkages across nations, exerts on the degree and scope of a firm's international diversification.

Our study further indicates that a firm's international diversification strategy is significantly influenced by the extent of foreign competition in its domestic market. A firm operating in a core industry characterized by a high level of foreign competition is more likely to have a higher level of foreign sales and to evidence more diversity in the distribution of its sales across geographic market regions. This is the first study to document that firms faced with growing foreign competition in their domestic market are likely to increase their international diversification and are therefore more inclined to compete on a global level. Prior research indicates that foreign competition in the domestic market brings in new players with lower cost structures that intensifies the level of competition within a market (Tybout, 2001), but our findings go further to suggest that these competitive pressures may serve to make domestic players who survive foreign competition in their domestic market more internationally competitive, as reflected by a higher level of foreign sales and a greater diversity of a firm's sales across geographic market regions.

Finally, our results indicate that higher levels of product diversification hamper a firm's ability to increase its international diversification. Our analysis therefore supports prior empirical research that has found that firms do appear to face a trade-off when seeking to expand via product or geographic diversification, and that pursuing both types of diversification leads to subpar performance (Delios and Beamish, 1999; Geringer *et al.*, 1989; Kim *et al.*, 1989; Tallman and Li, 1996). Our findings thus support the notion that, when a firm is already highly product diversified, limits on managerial attention represent a real constraint on a firm's ability to expand into international markets.

We were unable to extend our dataset beyond 1999 due to data constraints on several key measures. To alleviate concerns that our findings may be specific to the time period studied (1987–99), we undertook analysis on subsamples representing different time periods within the full time frame of

our study. We found no changes in either the statistical significance or directional influence of our model variables. This suggests that the phenomena we have modeled is not idiosyncratic to any particular time period but is instead structural. This, and the fact that current research continues to utilize the same underlying theoretical elements we have used to formulate our hypotheses, suggests that our results are also likely to be applicable to more recent time periods.

Consistent with prior research (Rugman, 1979), our study examined factors influencing a firm's international diversification strategy in terms of the relative importance of its foreign sales and the geographic scope of its sales. However, our choice to focus on sales-based measures limits our ability to assess whether the influences we identify would also be significant for understanding other aspects of a firms' international diversification strategy; for example, the level or scope of its foreign direct investment, outsourcing of production, or foreign-based R&D facilities. These clearly represent areas for further research.

A final consideration is that data limitations constrained us to operationalize foreign competition only in terms of import competition, and therefore to exclude competition from U.S.-based affiliates of foreign-owned companies (i.e., foreign domestic competition). In a preliminary analysis we did examine the influence of foreign domestic competition for the subperiod from 1987 to 1994. The results indicated that foreign domestic competition, like import competition, exerts a positive and significant influence on the degree and scope of a firm's international diversification; the results for all remaining model variables were qualitatively the same as those presented in this paper. Therefore, the omission of foreign domestic competition in our models does not appear statistically important for our conclusions.

In summary, by focusing mainly on the linkage between international diversification and firm performance, prior research has largely ignored how global environmental factors may influence a firm's international diversification. Hence, by developing a theoretical framework and presenting a set of empirical results that address the question of how changing global business conditions (in terms of the growing globalization of markets and industries) may influence corporate strategic choice regarding the degree and scope of a firm's international diversification, this paper has

helped to fill an important gap in the literature. More broadly, our analysis has contributed to the strategy literature by providing a more thorough theoretical framework and empirical investigation of an important and growing corporate strategic phenomenon: international diversification. In this respect, our study demonstrates the need for a more integrative model of a firm's decision to diversify internationally.

Our analysis has also made important methodological contributions. First, we conducted our empirical examination in a panel dataset to obviate concerns regarding the validity of inferences derived from a single cross-section analysis. Second, by estimating our causal models using TOBIT we were able to utilize a more complete and representative dataset of firms, and we were able to estimate models that incorporated both a firm's decision of whether to expand internationally and, if such expansion had already taken place, the degree and scope of its international diversification. Finally, our analysis highlighted an important methodological issue regarding the proper interpretation of interaction effects in nonlinear models such as TOBIT. Overall, it is hoped that our theoretical framework, research design, and statistical procedures can help guide further work on the increasingly important topic of globalization and its impact on firm strategy.

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APPENDIX: DATA METHODS AND SOURCES OF VARIABLES

This appendix describes the control variables in our models. Unless noted otherwise, all data were

taken from COMPUSTAT. Many of these variables are discussed in greater detail in Bowen and Wiersema (2005).

- *Firm Size* is measured as the logarithm of a firm's total sales.
- *Firm Performance* is measured by a firm's return on total assets.
- *Industry R&D Intensity* is measured by the ratio of industry R&D expenditures to industry shipments in a firm's four-digit SIC core industry. Data were derived from the National Science Foundation's report on R&D expenditures by industry (NSF, 1995, 1996, 1998, 2001).
- *Industry Capital Intensity* is measured by the ratio of the real capital stock to total employment in the four-digit SIC core industry of the firm. Annual data on industry real capital stock and employment came from Bartelsman and Gray (1996) and from the Annual Survey of Manufactures reported by the U.S. Census Bureau (2002).
- *Industry Economies of Scale* is measured for a given four-digit SIC industry using the 'mid-point' method (Kobrin, 1991; Pugel, 1978; Weiss, 1963). Data on average employment by establishment size at the four-digit SIC level were only available for benchmark economic census years 1992 and 1997 (U.S. Census Bureau, 1987, 1992). Our estimates of scale economies based on 1992 data were used for all years between 1987 and 1996; our estimates based on 1997 data were used for all years after 1996.
- *World Industry Growth* is measured by the annual growth in the nominal value of world production based on data presented in Nicita and Olarreaga (2001).
- *World Industry Trade Barriers* is measured by the average worldwide tariff rate for a given industry. The data were derived from Nicita and Olarreaga (2001).