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

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ABSTRACT

Significant reductions in barriers to international commerce since the mid-1970s have resulted in markets and industries becoming increasingly integrated across nations. A key consequence of industry globalization has been substantially increased levels of foreign competition in the markets of most nations, and in particular in the U.S. marketplace. The changes in competitive conditions facing firms as markets and industries become more globalized are significant economic phenomena that can be expected to impact corporate strategy in general, and corporate international diversification strategy in particular. Despite increasing global economic integration, the impact of industry globalization on corporate strategy is a question that has been largely overlooked in both the strategic management and international business literatures.

This paper seeks to fill this important gap by examining the role of both environmental and firm specific factors in shaping a firm's international diversification strategy. Specifically, we develop a theoretical framework for understanding how industry globalization, foreign competition, and firm product diversification would be expected to influence a firm's strategic choice of its level of international diversification. We then empirically examine for the predicted impact and importance of these factors in a panel data set of U.S. firms from 1987 to 1993. Our study provides the first empirical examination and evidence that industry globalization and foreign-based competition are statistically significant factors explaining the increased international diversification of U.S. firms.

Keywords: Corporate Strategy, Globalization, International Diversification

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

One of the most significant changes in the world economy during the past two decades has been the growing globalization of markets and industries. Numerous forces contributed to this globalization including reductions in multilateral trade barriers under the auspices of the GATT and reduced regional trade barriers due to a rising number of regional trade agreements¹; lower international transport and communications costs (Hummels, 1999); capital market reforms and greater global integration of financial markets; and the homogenization and convergence of consumer spending patterns among countries (Konya and Ohashiz, 2004). The consequences of such forces include widespread industry rationalization and heightened competition at both a regional and global level, as evidenced by rising numbers of cross-border mergers and acquisitions (UNCTAD), and the increasing number of companies who are multinational.²

Evidence of rising globalization emerged in the 1980s³ as world exports began to rapidly exceed the growth in world production.⁴ The growing integration of national economies was also indicated by a marked increase in the world stock of foreign direct investment (FDI) which, as a percentage of world GDP, rose from 10% in 1980 to 31% in 1999 (UNCTAD, 2000). Growing horizontal linkages between nations, represented by rising trade volumes and cross-border investments, has been accompanied by increasing vertical linkages as production activities have become more specialized and spatially dispersed; the trade flows that reflect such vertical specialization are estimated to now account for up to 30% of world exports (Hummels, Ishii and Yi, 1999; OECD, 2002a; Whichard and Lowe, 1995; Zeile, 1997; 2002). Underlying the growth in world trade volume is that most countries have increased their participation in international markets since the 1980s,⁵ with U.S. firms

¹ Organization for Economic Co-operation and Development (OECD), 1999; World Trade Organization (WTO), numerous years.

² The number of transnational companies (a parent company holding at least a 50% or more equity stake in an entity located outside the country of the parent) was estimated to be 7,276 in 1968 and 37,700 in 1990 (UNCTAD, 2000).

³ For example, United Nations Conference on Trade and Development (UNCTAD, 1993) refers to the rise of foreign direct investment during the 1980s as “the bulge in the trend.”

⁴ Between 1985 and 2002, growth in world exports of manufactured goods averaged 13.5% per year while world production grew at an average rate of about 2.7% per year (WTO, 2004).

⁵ For example, based on data presented in Heston, Summers, and Aten (2002), the volume of U.S. trade as a percentage of U.S. GDP grew from 13.3% in 1980 to 29.1% in 2000.

increasingly selling into multiple foreign markets and foreign sales an increasing share of total sales (Denis, Denis, and Yost, 2002).

While the processes of globalization have impacted countries and their firms in different ways, for U.S. firms rising globalization has meant a substantial increase in foreign competition. For the U.S., the OECD's index of "exposure to international competition" rose from 18.9% in 1985 to 29.2% in 1995,⁶ an increase of 55% over this period. In contrast, the average increase in the "exposure to international competition" increase by all other OECD countries was 24%, less than half that faced by U.S. firms (from 31.6% in 1985 to 39.1% in 1995) (OECD, 2002a). Similarly, imports as a share of total U.S. purchases of manufactured goods rose from 12.3% to 17.9% between 1985 and 1995 while the share of total U.S. manufacturing production accounted for by U.S. based affiliates of foreign companies rose from 10.6% to 15.7% over the same period (OECD, 2002a). 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). For U.S. based firms, and for many firms in other OECD countries, the dramatic increase in foreign competition has fundamentally changed the scope and nature of competition. The heightened international competition arising from industry globalization is expected to increase as countries continue to adopt policies to further open their domestic markets to foreign goods (Sachs and Warner, 1995).

The ongoing processes of globalization, and in particular the changes in competitive conditions facing firms as markets and industries continue to 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. In fact, it was recently suggested that the impact of industry globalization on the strategies of multinational firms may represent the "big unanswered question" for international business researchers (Buckley and Ghauri, 2004). Yet, despite its acknowledged importance, the role of industry globalization and associated environmental changes as forces shaping a firm's level of international diversification strategy has been largely neglected in prior research on international diversification strategy.

⁶ This measure indicates the fraction of domestic output that, whether exported or sold domestically, competes with production by foreign competitors (OECD, 2002a).

Prior research on international diversification strategy has mostly focused on the performance impact of international expansion by the firm (Bergsten, Horst, and Moran, 1978; Buhner, 1987; Capar and Kotabe, 2003; Denis, 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, Jammine, and Thomas, 1988; Kim, Hwang, and Burgers, 1989; 1993; Lu and Beamish, 2004; Mitchell, Shaver, and Yeung, 1992; Tallman and Li, 1996) and has largely ignored the more fundamental question of what drives a firm's level of international diversification strategy. Even when research has considered this more fundamental question the analysis has primarily focused on firm specific drivers (Delois and Beamish, 1999; Pearce, 1993; Sethi, Gusinger, Phelan, and Berg, 2003), and not on *global* economic factors (e.g., rising global integration of national markets and rising foreign competition) as influences shaping a firm's international diversification strategy. Hence, while past research on international diversification strategy has contributed toward understanding the consequences of international expansion for economic performance; such studies provide an incomplete basis for a more formal understanding of a firm's international diversification strategy.

This paper seeks to broaden our understanding of corporate strategy by examining the role of both environmental and firm specific factors in shaping a firm's international diversification strategy. Specifically, we examine how industry globalization, foreign competition, and firm product diversification influence a firm's strategic choice of its level of international diversification; a set of relationships not previously examined. In addition, our analysis contributes to the literature on corporate strategy 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.

Our theoretical framework incorporates two important phenomena that can drive a firm's international diversification: the extent of foreign competition and the extent of an industry's globalization. Foreign competition is captured by both import competition and competition from foreign domestic production (i.e., sales by U.S. based affiliates of foreign owned companies). Globalization at the industry level is captured by an industry's worldwide trade volume and its extent of intra-industry trade. To our knowledge, this is the first time that the influences of distinct sources of foreign competition, and of distinct aspects of global integration, at the industry level have been separately examined.

Our analysis focuses on a firm's strategic response, in terms of its level of international diversification, to industry globalization and foreign competition in its core

business.⁷ Our focus on a firm's core business is motivated by both the observation that geographic expansion by firms occurs primarily in their core business (Davies, Rondi, and Sembenelii, 2001) and the fact that, by virtue of its relative size and as the source of a firm's distinct capabilities, the potential for economies of scale and scope are greatest in a firm's core industry. A firm's core business is therefore not only a significant source of revenue;⁸ it is also of significant strategic importance. Due to the importance to the firm of its core business, structural changes arising from increased globalization and increased competitive rivalry engendered by foreign competition in a firm's core business are more likely to command a strategic response by the firm. As a result, strategic choice by a firm regarding its level of international diversification in response to industry globalization and foreign competition is likely to be more pronounced, and therefore more likely to be evidenced in the data.

Our empirical investigation is conducted in a panel (i.e., pooled time series, cross-section) data set of U.S. firms from 1987 to 1993. Our use of panel data allows us to capture the dynamic evolution of international diversification within and between firms. This 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 sample comprises both internationally diversified and non-internationally diversified firms which, in addition to being a more representative sample of firms, allows us to account for the influence of our variables on both a firm's decision to be internationally diversified and, if internationally diversified, its level of international diversification. We statistically incorporate these two dimensions of international diversification strategy by deriving our estimates using the non-linear TOBIT procedure. This procedure takes account of these two decisions when deriving parameter estimates, and it also obviates potential estimation biases that could arise from the application of standard linear regression in a sample that includes both types of firms. Finally, as part of interpreting our estimation results, we demonstrate the proper methods for analyzing interaction variables in the context of the nonlinear TOBIT model. To our knowledge this is first time this issue has been addressed in the context of

⁷ The core business is the business segment that earns the largest revenue for the firm. Operationally, the core business is defined as a firm's largest 4-digit SIC business (Rumelt, 1974).

⁸ In our sample the core business constitutes, on average, 63% of sales for multi-business firms and 82% of sales among all firms.

empirical strategy research.⁹ Overall, our research design, estimation technique, 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 is likely to influence the firm's level of international diversification. Foreign competition in a firm's domestic market can take two forms: imports of foreign produced goods and local production by affiliates of foreign-owned companies. Both forms of foreign competition substantially increase the competitive intensity in a domestic firm's home market. Competition from foreign-based firms (i.e., imports) is, in particular, likely to increase competitive rivalry in an industry since foreign firms are likely to 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; DeBacker, 2002; Driffield and Munday, 2000). Competition from foreign firms introduces diverse and less familiar capabilities into an industry and creates a more dynamic and uncertain competitive environment (Ghoshal, 1987; Kogut, 1983). Increased competition from foreign firms engenders changes in the rate of technological developments in an industry (Caves, 1974, 1996; DeBacker, 2002; Scherer and Huh, 1992) and also creates greater pressure to increase efficiency to remain competitive (Caves, 1996; Chung, 2001a, 2001b; Driffield and Munday 2000) since foreign firms are likely to be leveraging specific advantages (Caves, 1971). Increased foreign competition also decreases industry price-cost (profit) margins (Chung, 2001b; Domowitz, Hubbard, and Petersen, 1986; Ghosal, 2002; Katics and Petersen, 1995). Falling industry profit margins, rationalization of production, pressures for greater intra-plant efficiency and technological developments all provide evidence that foreign competition, whether foreign-based or domestic-based, significantly intensifies competition at the industry level (Tybout, 2001).

⁹ Ai and Norton (2003) discuss the proper interpretation of interaction variables in limited dependent variable models in the context of health science research.

The influence of foreign competition on domestic firms' international diversification strategy operates on two levels. First, foreign competition forces domestic firms to become more competitive if they are to successfully meet the challenges of foreign rivals. Increased foreign presence in an industry has been found to increase productivity and efficiency (Chung, 2001b) as well as the comparative advantage of the domestic industry (Driffield 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 home market will also have demonstrated the possibility that they can compete successfully against foreign rivals outside their domestic market, and hence also more capable of operating and competing at a global level. If so, the extent of foreign competition in an industry may be indicative of a set of domestic firms likely to have higher levels of international diversification.

Second, to counter the competitive threats particularly of foreign-based rivals, domestic firms may seek to expand their international diversification in an effort to offset any location specific advantages enjoyed by their foreign rivals. In addition, since competition from foreign firms challenges domestic firms to become more competitive at a global level, domestic firms may also 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 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, Gusinger, Phelan, and Berg, 2003).

Whether a firm seeks to offset location based advantages of its foreign rivals, or to build global based scale and scope advantages with which to engage foreign rivals in global markets, we would expect such proactive responses to be evidenced by a higher level of international diversification by the firm.

Hypothesis 1: The level of firm international diversification will be positively related to the level of foreign competition.

Industry Globalization

The growing globalization of markets and industries over the past 20 years is a significant economic phenomenon that has fundamentally changed the competitive conditions

facing firms, and is therefore likely to have a significant impact on the international diversification strategy of firms. Industry globalization is a process characterized by growing linkages between national markets in terms of consumers, the production activities of firms, and the extent of the relevant market in which firms compete (OECD, 2002b). A global industry is therefore 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).

Research has documented how firms in an industry shift from operating and competing in local domestic arenas to operating and competing in a worldwide market (Bartlett and Ghosal, 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 (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).

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 (Makhija, Kim, and Williamson, 1997; Morrison and Roth, 1992). At a world level, the more rapid growth in world trade (exports) relative to world production in manufacturing that began in the mid-1980s offers strong evidence of the growing integration of markets.¹⁰ 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). This aspect of industry globalization, the level of global linkages and integration within an industry, can be captured by the level of intra-industry trade in an industry (Kobrin, 1991).

¹⁰ Over the period 1987-1993, which spans the time frame of this study, the volume of world exports of manufactures grew at an annual rate of approximately 6% while the volume of world production grew at only 1.8% per year (WTO, 2004).

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 re-evaluate 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 industry rises, international expansion is more likely to become a strategic priority of the firm.

As industry globalization rises, firms that adopt a more international strategy can gain competitive advantages from a variety of sources in order to better compete on a global level. Competitive advantages can be gained from exploiting location differences in national resource endowments (Kogut, 1983) as well as leveraging strategic resources and achieving economies of scope across markets (Kim Hwang, and Burgers, 1993). Inter-regional 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 re-evaluating whether certain activities should be undertaken internally or outsourced (Kogut, 1983; Porter, 1986).

The existence of world level economies of scale in manufacturing and in R&D can substantially reduce costs for more international competitors. Similarly, when buyer tastes converge, it provides an opportunity to leverage product development, brand name, and goodwill across a larger customer base. A firm cannot ignore the competitive ramifications of these changes in the fundamentals of the industries in which it operates. 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).

The significant changes in economic and market fundamentals that arise as an industry becomes more globalized can therefore be expected to have strategic ramifications for firms competing in that industry. We expect that a higher level of industry globalization in a firm's core market would motivate the firm to expand its strategic scope internationally, and to therefore lead the firm to increase its level of international diversification.

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

The magnitude of a firm's response to increase its level of international diversification due to increased globalization in its core business industry is likely to vary with the nature of the competitive conditions in its domestic market. Specifically, a firm whose core business is located in an industry faced with high levels 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 response to high levels foreign competition a firm is more likely to expand internationally in the face of rising industry globalization for two reasons: first, as global markets expand the firm may see limited prospects for expansion within its domestic market and would therefore seek additional expansion in international markets. Second, a firm may seek to counter high levels of foreign competition, particularly import competition, by locating some or all of its production abroad (e.g., to lower labor cost countries) in an attempt to neutralize location specific advantages of foreign rivals as an industry becomes more globalized. Given this, we expect that the higher the level of import competition in a firm's core industry, the greater (more positive) would be the firm's response to increase its level of international diversification when faced with increased industry globalization in its core business industry.

Hypothesis 2b: The higher the level of import competition in a firm's core business industry, the greater (more positive) will be the relationship between the level of firm international diversification and the level of industry globalization.

Product Diversification

The level of a firm's product diversification can be expected to influence a firm's level of 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 are jointly reinforcing and can be pursued simultaneously by the firm. Both the resource-based view (RBV) and transaction cost economics (TCE) theories suggest that a substitute relationship is to be expected.

Resource-based theory posits that the basis and motive for the corporate strategic choice regarding expansion via product diversification or international diversification is the opportunity to leverage the firm's excess resources into new markets (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 incremented. For

example, researchers have found that, with regard to investment decisions, there are tradeoffs 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 would suggest that past decisions by the firm to expand its business portfolio places a real constraint on the firm's ability to subsequently expand geographically.

Transaction cost economics (Coase, 1937; Williamson, 1985) posits that an expansion of corporate scope will involve a comparison of the relative costs of negotiating, monitoring, and enforcing contracts associated with carrying out the transactions internally (hierarchical) versus externally (via a market). Based on TCE, researchers have posited that higher levels of diversification (either product or international) will 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: p.165; Hill and Hoskisson, 1987). Given that expansion by a firm into new geographic and/or product markets will require greater coordination and control by management over the activities of the firm (Penrose, 1959), it follows that past decisions on the part of the firm to expand its business portfolio by product diversification will raise the costs of any subsequent attempt to expand into international markets.

The preceding indicates that both RBV and TCE imply that a firm's past decisions regarding its level of either product diversification or international diversification would influence subsequent decisions and, moreover, that the nature of the relationship will involve a tradeoff between these two modes of expansion by the firm. Indeed, prior empirical research indicates that firms do appear to face a tradeoff when seeking to expand via geographic or product diversification, and that pursuing both types of diversification indeed leads to sub-par performance (Delios and Beamish, 1999; Geringer, Beamish, and daCosta, 1989; Kim, Hwang, and Burgers, 1989; Tallman and Li, 1996). In this context, it has also been found that international expansion into areas unrelated to the firm's core business operations leads to 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 suggests that there are two paths, one indirect and one direct, by which a firm's level product diversification influences its level of international diversification. Indirectly, the trade-off between product and geographic market expansion implies that the extent of a firm's product diversification will moderate the influence of any factors driving the

firm's international diversification strategy. In particular, the degree to which a firm will expand internationally in response to increased industry globalization would be expected to be influenced by its level of product diversification. As noted above, firms with higher levels of product diversification are likely to face higher resource and managerial constraints. High levels of product diversification may therefore constrain a firm's ability to develop global competitive advantages and to thus compete internationally (Wan and Hoskisson, 2003). We therefore expect that a firm with high levels of product diversification would respond less positively to increase its level of international diversification when faced with increased industry globalization in its core industry.

Hypothesis 2c: The higher the level of firm product diversification, the less positive will be the relationship between the level of firm international diversification and the level of industry globalization.

In addition to moderating the influence of increased globalization on a firm's level of international diversification, the level of a firm's product diversification would also be expected to exert a direct influence on a firm's international diversification. Specifically, higher levels of product diversification increase the coordination and control requirements of management, and also impose constraints on the amount of managerial attention and firm resources that are available to the firm to expand its international diversification. Conversely, firms with more focused business portfolios are less likely to face such limits. Since higher levels of product diversification serve as a constraint on the firm's ability to pursue international expansion, we expect that a firm's level of international diversification would be negatively related to its level of product diversification.

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

METHODS

Model Specification

Our focus is on how U.S. firms' respond strategically in terms of their international diversification to the presence of foreign competition in their domestic market, industry globalization, and the level of product diversification. To investigate this relationship we

adopt a model that specifies the level of international diversification in relation to the levels of these explanatory variables *lagged* one period. Lagged values are used since we expect a firm's current international diversification decision to be influenced by competitive and firm specific conditions in a prior period. The model also contains a set of firm and industry level control variables suggested by prior research. Controls at the firm level are firm size and firm financial performance; controls at the industry level are industry R&D intensity, industry economies of scale, world industry growth, and world industry trade barriers (Buckley and Ghauri, 2004; Caves, 1982; Lu and Beamish, 2004; Makhija, Kim, and Williamson, 1997; Morrison and Roth, 1992).

To study the potential moderating influences of import competition and firm product diversification on a firm's international diversification response to increased industry globalization we augment the model to include interaction terms between import competition and industry globalization and between firm product diversification and industry globalization. The full model can be written as:

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

The partial model with no interaction effects is obtained by setting β_{10} and β_{11} to zero in the above equation.¹¹

Data Sample and Estimation

Our models are estimated in a panel data set of U.S. firms covering the period 1987-1993. The models use the one year lagged values of the foreign competition, industry globalization, firm product diversification, and firm performance variables. Our focus on U.S. firms and the choice of time period are dictated by data limitations, particularly for the data on

¹¹ Time dummy variables, one for each year of data, were initially included in each model to capture possible movements in international diversification due to possibly omitted variables that evolve over time. However, in subsequent estimation these time dummies were not statistically significant and were therefore dropped.

domestic-based foreign competition which is measured using data on the production by U.S. affiliates of foreign owned companies. As we discuss in detail below, these data were only available at a sufficient level of industry detail for the years 1987 to 1992 inclusive. Lastly, our focus on U.S. firms also reflects data constraints, particularly limitations on sourcing data on domestic-based foreign competition, firm product diversification, and foreign sales for non-U.S. firms. The full panel consists of 6,435 observations representing varying numbers of firms in each sample year.

Of the 6,435 observations in our sample, 2,046 (31.7%) are firms with no international diversification and who therefore have a zero value for the dependent variable. When a sample contains a large number of observations that take a single limit value (e.g., zero) estimation using traditional linear least squares (OLS) can result in biased and inconsistent parameter estimates (Greene, 2003). An appropriate estimation technique in such cases is instead the nonlinear TOBIT procedure (Greene, 2003). This procedure takes proper statistical account of “limit” observations and it results in parameter estimates that (unlike OLS) are both consistent and asymptotically efficient.

TOBIT estimates are derived using the method of Maximum Likelihood Estimation (MLE). Analysis of results derived from MLE focuses on the significance of each estimated coefficient and the overall significance of the model as judged by a Chi-square statistic derived from the ratio of the log-likelihoods of two models: one that includes all independent variables and one that includes only a constant term. This Chi-square test is analogous to the “overall F-test” of model significance common in least squares estimation.

There is no counterpart in MLE to the R-square obtained from linear least squares because MLE is not based on obtaining a “best fit.” A sometimes used measure of “goodness of fit” is the “pseudo-R-square,” calculated as $1 - (L/L^*)$, where L is the maximized value of the log-likelihood when all variables are included in the model and L^* is the maximized value of the log-likelihood when the model contains only a constant. While the pseudo- R^2 has intuitive appeal, and we will report its value for each of our models, we caution that higher values of the pseudo-R-square have no direct interpretation in terms of an increasing “goodness of fit” (Greene, 1997, p. 891).

In the TOBIT framework, an issue that arises for hypothesis testing is that an estimated coefficient does not indicate the true size of the effect on the dependent variable due to a change in an independent variable. This arises because the conditional mean of the

dependent variable is a nonlinear function of the explanatory variables,¹² and hence the true effect of a change in an explanatory variable is not constant, as in standard linear regression (Bowen and Wiersema, 2004). Instead, one computes what is called a variable's "marginal effect," whose value depends on the values of all variables in a model. A variable's marginal effect and its estimated coefficient will differ in magnitude, but they will have the same sign (Bowen and Wiersema, 2004). This means that computing a variable's marginal effect is not important for testing Hypotheses 1, 2a and 3 since these hypotheses are concerned only with the *directional* effect, and not the magnitude, of a change in foreign competition, industry globalization, or firm product diversification on the level of a firm's international diversification.

However, to test the moderator Hypotheses 2b and 2c further analysis is required since the value of the true interaction coefficient in a TOBIT framework depends on the values of all variables in a model, and it can differ in both sign and magnitude from the estimated coefficient on an interaction variable.¹³ To test a moderator hypothesis in a TOBIT framework one must therefore calculate the value of the true interaction coefficient and then test for its statistical significance (i.e., different from zero) at different values of the moderator variable (Ai & Norton, 2003). If significant, the sign of the calculated interaction coefficient then indicates the direction influence of the moderator (e.g. import competition) on the relationship between the dependent variable and a given explanatory variable (e.g. industry globalization). The nature of the effect that a moderating variable has is further assessed by calculating an explanatory variable's "total marginal effect," which includes both the direct effect of the explanatory variable on the dependent variable as well as its indirect effect via its presence in the interaction variable. This analysis indicates how the value of the total marginal effect of the explanatory variable on the dependent variable changes at different levels of the moderator variable.

Finally, heteroscedasticity is a statistical issue likely to arise when studying cross-sectional variation (Bowen and Wiersema, 1999), and hence also in panel data. To anticipate this possibility, our TOBIT estimates were derived assuming a general form of

¹² For the Tobit model, this conditional mean is $E[Y | X] = \Theta(X\beta/\sigma)X\beta + \sigma\phi(X\beta/\sigma)$ where $\Theta(\cdot)$ is the standard normal c.d.f., $\phi(\cdot)$ is the standard normal p.d.f., X is the matrix of explanatory variables, σ is the standard deviation of the disturbances, and β the vector of model coefficients (Bowen and Wiersema, 2004).

¹³ In general, the interaction coefficient associated with variable X and moderator variable Z is the cross-partial derivative of the conditional mean of the dependent variable with respect to these variables (i.e., $\partial^2 E[Y | X, Z] / \partial X \partial Z$). For models, whose conditional mean is a non-linear function of model variables (e.g, Tobit)

heteroscedasticity in which the disturbance variance is modeled as an exponential function of one or more of the explanatory variables (Greene, 2003). Based on appropriate likelihood ratio tests (not shown) the hypothesis of homoscedasticity was rejected for each of our models. In this respect, additional analysis indicated that the disturbance variance was systematically related only to the three firm level variables: firm product diversification, firm size and firm performance. Our specification of heteroscedasticity therefore involves only these three variables.

Main Measures and Data Sources

Firm International Diversification

The level of a firm's international diversification is measured by its foreign sales as a percentage of its total sales. Researchers have extensively used this indicator of the relative size of foreign operations as a measure of firm international diversification (Capar and Kotabe, 2003; Geringer, Beamish, daCosta, 1989; Geringer, Tman, and Olsen, 2000; Tallman and Li, 1996). Annual data on firm foreign sales were derived from the geographic segment database of COMPUSTAT.

Foreign Competition

Foreign competition in a market consists of imported goods and goods produced and sold domestically by U.S. affiliates of foreign owned companies. To capture these two dimensions of foreign competition we use two measures: import competition and foreign domestic production.

Import Competition. Import competition captures foreign competition in the form of foreign produced goods that compete with goods produced and sold in the U.S. market. Import competition is measured by the ratio of imports to total domestic consumption in the 4-digit SIC core industry of the firm. Since data on total domestic consumption by SIC does not exist we instead use "apparent consumption." For each industry, apparent consumption is the total value of domestic production minus exports plus imports. Annual data on imports and exports at the 4-digit SIC level were taken from the National Bureau of Economic Research's (NBER) Trade and Immigration Database (Abowd, 1990). Annual data on production (value of shipments) at the 4-digit SIC level were taken from the NBER Manufacturing Productivity Database (Bartelsman and Gray, 1996). Average import

one must derive this cross-partial derivative and compute its value at different values of the explanatory variables.

competition across the 4-digit SIC core industries represented in our sample of firms increased from 14.6% in 1986 to 18.4% in 1993, an increase of 26%.

Foreign Domestic Production. Foreign domestic production captures foreign competition that comes from the affiliates of foreign owned companies that produce and sell in the U.S. market. Foreign domestic production is measured by the ratio of total sales by U.S. affiliates of foreign owned companies to total U.S. domestic consumption in the 4-digit SIC core industry of the firm. As for the import competition measure, domestic consumption is imputed as “apparent consumption.” Annual data on production by U.S. affiliates of foreign owned companies were taken from the series on Foreign Direct Investment in the U.S. (FDIUS) compiled by the U.S. Department of Commerce’s Bureau of Economic Analysis (BEA). These data are collected at the manufacturing establishment level by 4-digit SIC and include all (non-bank) foreign owned entities. These data are the most comprehensive available for indicating the presence of foreign competitors located in the U.S. market. The data for 1987 and 1992 come from the Benchmark Surveys of all establishments of U.S. affiliates of foreign companies; data for the years 1988 to 1991 are derived by the BEA by linking company data in FDIUS with Census Bureau establishment data on all U.S. companies. Average foreign domestic production across the 4-digit SIC core industries represented in our sample of firms increased from 15.3% in 1986 to 17.9% in 1993, an increase of 17%.

The detailed establishment level data on foreign-owned establishments used to calculate our measure of foreign domestic production were only available for the years 1987 to 1992. The BEA does provide establishment level data for later years, but only at an aggregated industry level that comprises only 62 SIC equivalent manufacturing industries. This lower level of industry detail was considered too coarse to provide a suitable measure of foreign domestic production. The lack of sufficiently detailed industry data beyond 1992 was therefore the factor that constrained our choice of time period for analysis.

Industry Globalization

Researchers have identified a variety of measures for the drivers and outcomes associated with industry globalization. These include product standardization, economies of scale, technological intensity, and competitive factors (Bartlett and Ghosal, 1989; Johansson and Yip, 1994; Morrison and Roth, 1992). In this paper we are interested in measuring the actual level of industry globalization rather than its drivers and we therefore focus on output based measures. 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 (Makhija, Kim, and Williamson, 1997). No one measure can capture both of these dimensions of industry globalization and we accordingly use two measures: the world volume of trade in a firm's core industry to capture the extent of an industry's international linkages and the extent of intra-industry trade in a firm's core industry to capture the degree of global integration of value-added activities.

World Industry Trade Volume. Prior research has used industry trade volume, measured as the sum of industry exports plus imports relative to industry sales, to capture the extent of an industry's international trade linkages (e.g., Morrison and Roth, 1992). The level of international trade relative to the size of the industry is indicative of the importance of international linkages, but does not differentiate in terms of the relative importance of imports vs. exports or the degree of global integration of the firm's value added activities. Prior studies have used only national level data on trade flows and production (e.g., U.S. trade flows and U.S. production). The use of national level data can however impart a bias if one's interest is to capture the extent of an industry's worldwide international linkages. We therefore adopt a world measure of trade volume, calculated using values of world trade and world production in a firm's core industry. Our measure, World Industry Trade Volume, is calculated as:

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

At the world level, imports equal exports and therefore our measure is equivalent measuring trade volume as the sum of 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). In the period 1987 to 1993, which encompasses the time frame of our study, the volume of world exports of manufactured goods grew at an annual rate of approximately 6% while the volume of world production (sales) of manufactured goods grew at only 1.8%.¹⁴

Annual data on worldwide industry sales and worldwide industry imports were derived from the World Bank's Trade and Production database (Nicita and Olarreaga, 2001). This database contains data on the exports, imports, and production of 67 developed and

¹⁴ Calculations by the authors based on World Trade Organization (2004) data for the 1987 to 1993 period.

developing countries over the period 1976-1999. The industry classification used by the database is the 3-digit level of the International Standard Industrial Classification (ISIC).¹⁵

As no official correspondence between the 3-digit ISIC system and the 1987 3-digit U.S. SIC system is available, we matched world import and world production values (over the 67 countries) in each of the 28 3-digit ISIC industries to each of 126 3-digit SIC industries appearing in our sample of firms. The correspondence between ISIC and SIC industries was made by matching the descriptions of the activities in each industry under each classification system. Since the number of 3-digit SIC industries (126) exceeded the number of 3-digit ISIC industries (28), a given 3-digit ISIC industry may have been matched to multiple 3-digit SIC industries. In such cases, the world import or world production values in a given 3-digit ISIC industry were allocated to each 3-digit SIC industry based on the fraction of each 3-digit SIC in total sales across those 3-digit SIC industries matched to a particular 3-digit ISIC industry. This procedure resulted in world import and world production values for each of the 126 3-digit SIC industries appearing in our sample of firms. The value for World Industry Trade Volume for each 3-digit SIC industries was then computed using the above formula, and these calculated values were then matched, at the 3-digit SIC level, to the core industry of each firm in the sample.

Intra-Industry Trade. Industry globalization also involves the dispersion of a firm's value added activities on a worldwide basis. Key drivers of globalization such as scale economies and product standardization will lead a firm to globally disperse its value chain activities (Bartlett and Ghosal, 1989; Johansson and Yip, 1994; Morrison and Roth, 1992). Globally integrated industries are characterized by international sourcing for components, raw materials, as well as other value-added activities such as R&D. The extent to which firms' activities are globally dispersed is therefore an important dimension of industry globalization (Makhija, Kim, and Williamson, 1997). Prior research (Kobrin, 1991; Makhija, Kim, and Williamson, 1997) has used the extent of intra-industry trade in an industry to capture the degree of international dispersion of value added activities within an industry, and to therefore capture the extent to which firms integrate their activities on a global basis. The extent of intra-industry trade in an industry is measured using the index of intra-industry trade first developed by Grubel and Lloyd (1975). This index can be written:

¹⁵ The worldwide measures were calculated based on annual data for 67 countries that include those with the highest GDPs and trade volumes in the world.

$$\text{Intra-industry Trade} = \frac{[(\text{Exports} + \text{Imports}) - \text{absolute value}(\text{Exports} - \text{Imports})]}{(\text{Exports} + \text{Imports})}$$

The trade values in this formula are measured at the industry level. Intra-industry trade measures the fraction of total trade volume for an industry that is “matching” or two-way trade and thus captures the exchange of goods within an industry category (Greenaway and Milner, 1986). Values of the measure range from zero to one. A zero value means that trade in the industry consists entirely of either exports or imports and that the firms in the industries lack global integration of their value added activities across national boundaries. A value of one occurs when exports equal imports so that all trade is intra-industry trade. Higher values of the intra-industry trade measure are indicative of industries where there is greater global integration of the firms’ value added activities across national boundaries. Values of the intra-industry trade measure were calculated for each 4 digit SIC industry using annual data on U.S. exports and U.S. imports at the 4-digit SIC level taken from the United Nations Trade Data Bank.

Firm Product Diversification

Firm product diversification is measured using Jacquemin and Berry’s (1979) entropy measure of diversification that captures the extent of diversity across a firm’s activities. The measure is calculated as:

$$\text{Firm Product Diversification} = \sum_{i=1}^N S_i \ln(1/S_i)$$

where S_i is the share of a firm's total sales in the 4-digit SIC industry i and N is the number of the firm's businesses.

Annual data on firm sales in each of 10 possible 4-digit SIC business segments were taken from the COMPUSTAT Line of Business database.

Firm Level Control Variables

Two firm level variables, firm size and firm performance, are used to account for variations in international diversification that may arise from differences in firm characteristics.

Firm Size. Prior research indicates that firm size, as an indicator of scale, is positively linked to a firm’s level of international diversification (Buckley and Pearce, 1979; 1981). Firm size has also been found to be positively related to firm foreign direct investment (Wolf, 1975). We expect international diversification and firm size to be positively related.

Following past research, we measure firm size by the logarithm of a firm's total sales.¹⁶ Annual data on firm sales were taken from COMPUSTAT.

Firm Performance. Prior research has shown a positive relationship between international expansion and firm profitability (Bergsten, Horst, and Moran, 1978; Grant, 1987; Rugman, 1979; Wolf, 1975). Many of these studies postulate that geographic expansion leads to higher performance due to firms' leveraging scale and scope economies. However, since the majority of these past studies are cross-sectional in nature, it is not possible to rule out a reverse linkage: higher firm performance can also provide the firm with resources to expand internationally. To reflect this linkage, our models use *lagged* firm performance. We expect international diversification and to be positively related to *lagged* firm performance.

Firm performance is measured by a firm's return on assets (ROA). ROA is a widely employed measure of performance and it has been shown to be related to a variety of other indicators of a firm's financial performance (Keats and Hitt, 1988). Annual data on firm ROA were taken from the COMPUSTAT line of business database.

Core Industry Variables

A firm's core business is traditionally defined as the firm's largest 4-digit SIC business segment (Rumelt, 1974). For this study, the core business is defined as the business segment that earned the largest revenue among the firm's portfolio of businesses in 1987. Based on the identity of the firm's core business, the core industry is defined as the 4-digit SIC industry in which the core business operates. The identity of the core business is held fixed over the sample period.

We employ four core industry variables (industry R&D intensity, industry economies of scale, world industry growth, and world industry trade barriers) to control for variation in international diversification due to differences in core industry characteristics across firms. Prior research has indicated that economies of scope at the firm level may be the basis for international expansion. Our final models include industry R&D intensity as a measure of technological scope, but they do not include advertising intensity since this variable was not found to be significant in initial estimation of our models. Our finding for advertising intensity is consistent with prior research that has also considered the influence of this variable (Kobrin, 1991).

¹⁶ Since our dependent variable is foreign sales relative to a firm's total sales, concerns about spurious correlation between the dependent variable and firm size were investigated by estimating each of our models using the logarithm of total firm assets as an alternative measure of firm size. The estimates derived using this alternative

Due to its lack of significance, and the fact that data on this variable were only available for a limited number of firms, advertising intensity was excluded from our models.

Industry R&D Intensity. Industry R&D intensity is considered indicative of intangible assets, such as technological know-how and patents, that can be the source for economies of scope in an industry (Teece, 1982). Firms can leverage intangible organizational assets such as R&D by expansion overseas (Kogut, 1983).¹⁷ Prior research has shown a firm's geographic scope to be positively related to industry R&D intensity (Bergsten, Horst, and Moran, 1978; Delios and Beamish, 1999; Grubaugh, 1987; Lall, 1980; Pugel, 1978, 1981). We therefore expect firm international diversification and industry R&D intensity to be positively related.

Industry R&D intensity is measured by the ratio of industry R&D expenditures to industry shipments in the 4-digit SIC core industry of the firm. Annual R&D expenditures by industry were taken from various years of the National Science Foundation's report on R&D expenditures by industry (National Science Foundation, 1995 and 1996).

Industry Economies of Scale. The presence of scale economies in an industry has been found to be a significant cost driver for firms to expand overseas and for industries to become more global (Caves, 1971; Hymer, 1960; 1976). Economies of scale in a firm's core industry enable the firm to expand overseas by gaining the benefit of lower costs from leveraging its economies of scale in the larger global market. We expect firm international diversification and core industry economies of scale to be positively related.

Economies of scale in a given 4-digit SIC industry is measured using the "mid-point" method (Kobrin, 1991; Pugel, 1978; Weiss, 1963). This method computes the average employment size of those establishments that produce the median level of industry output. This average employment figure is then divided by total industry employment across all establishments. Data on average employment by size of establishment by 4-digit SIC were readily available for the benchmark economic census year 1992 as compiled by U.S. Census Bureau. We were constrained to using 1992 values for the entire sample period due to data availability. However, as values of this variable are likely to change slowly over time and, given the relatively short time span of our panel data set (1988-1993), we do not expect the use of only 1992 data to be an important limitation.

measure were virtually identical to those when the logarithm of firm sales was used. Given this, we use the logarithm of firm sales in our models for comparability with existing literature.

World Industry Growth. World industry growth is an indicator of the attractiveness of an industry in terms of its sales growth potential and opportunity for firm expansion. We therefore expect firm international diversification and growth in world output in a firm's core industry to be positively related.

Annual world industry growth is measured by the annual growth in the nominal value of world production derived from the World Trade and Production database (Nicita and Olarreaga, 2001). The annual growth in output in each 3-digit SIC industry was computed after matching the World Trade and Production data on world output at the 3-digit ISIC level to the 3-digit U.S. SIC. The method used to match ISIC industries to U.S. SIC industries is the same as that described above for our computation of the world industry trade volume measure.

World Industry Trade Barriers. World industry trade barriers is an indicator of the extent of worldwide impediments to international trade in products that comprise the core industry of the firm. Such impediments raise the firm's cost to supply foreign markets and hence make it more difficult for the firm to expand into international markets. Such impediments include import tariffs (taxes levied on imports) but can also include a variety of "non-tariff" barriers such as restrictions on the quantity of goods that can be imported (import quotas) and other non-tax barriers such as administrative delays (World Trade Organization, 2004). Data on the wide range of tariff and non-tariff barriers is difficult to obtain. For this reason, we use here only information on the worldwide average tariff (import tax) with respect to a firm's core industry.

The tariff rate in an industry has been extensively used in the international trade literature as an indicator of trade barriers in an industry (Anderson and Neary, 1994; Balassa and Balassa, 1984; Balassa, 1965; Bowen, Hollander and Viaene, 1998; Finger and Laird, 1987; Finger and Olechowski, 1987; Laird and Yeats, 1990; Leamer, 1974; Nogués, Olechowski and Winters, 1986; Schuknecht, 1992). Since a firm's cost to supply a foreign market via exports will be higher the higher is the import tax imposed by an importing country, we expect firm international diversification and world industry trade barriers to be negatively related.

Annual data on the average worldwide tariff in a given 3-digit SIC industry were derived from the World Bank Trade and Production database (Nicita and Olarreaga, 2001). For each of 67 countries, the database reported a country's average MFN (Most Favored

¹⁷ We also examined the influence of firm level R&D intensity; the results were identical to that using industry R&D intensity. Since firm level data was only available for a sub-sample of firms, we utilized industry R&D

Nation) tariff rate in each of 28 3-digit ISIC industries.¹⁸ From these data we calculated the average tariff rate across all 67 countries in each 3-digit ISIC industry. Each 3-digit SIC industry was then matched to a specific 3-digit ISIC industry to obtain the average worldwide tariff rate in each 3-digit SIC industry. In our sample, world industry trade barriers as measured by the average tariff rate in a firm's core industry ranged from 0.67% to 13.8%, with a mean of 3.04%.

RESULTS

Table 1 presents the means, standard deviations, and correlations for all variables based on the sample of 6435 observations. Table 2 presents the heteroscedasticity corrected TOBIT results of estimating the partial (interactions excluded) and full models. Prior to estimation all variables were standardized to have a mean of zero and a variance equal to one. For each model, the Chi-square statistic indicates strong model significance ($p < 0.01$) over the simple model that includes only a constant.

Model 1 in Table 2 shows the results of estimating the level of firm international diversification in relation to lagged foreign competition, lagged industry globalization, lagged firm product diversification, and the firm and industry control variables. The Chi-square statistic indicates strong model significance ($p < .01$) over the simple model that includes only the constant. In Model 1, firm international diversification is positive and significantly related to both lagged import competition and lagged foreign domestic production. Higher levels of foreign competition in a firm's core industry, whether from imports or domestic sales of U.S. based foreign affiliates, leads to higher levels of geographic expansion by the firm. These results support Hypothesis 1, that the level of firm international diversification will be positively related to the level of foreign competition.

In Model 1, firm international diversification 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 more intra-industry trade, leads to higher levels of international diversification by the firm. These results support Hypothesis 2a, that the level of firm international diversification will be positively related to the level of industry globalization.

intensity in our model.

¹⁸ The tariff averages reported in the World Trade and Production database were derived from tariff rates at a detailed commodity level. See Nicita and Olarreaga (2001).

The results for Model 1 also indicate that firm international diversification is negative and significantly related to lagged firm product diversification. This result supports Hypothesis 3, that the level of firm international diversification will be negatively related to the level of firm product diversification.

Lastly, all firm control variables – firm size and firm performance – are significant and positively related to firm international diversification as anticipated. The core industry variables: R&D intensity, economies of scale and world industry growth are significant and positively related to firm international diversification as anticipated. World industry trade barriers, another core industry variable, is significant and negatively related to firm international diversification as anticipated.¹⁹

Insert Table 1 and 2 About Here

Model 2 in Table 2 shows the results of estimating 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 import competition and industry globalization and between firm product diversification and industry globalization. The Chi-square statistic testing joint significance of the interaction variables indicates strong significance for Model 2 compared to Model 1 (which excludes the interaction variables) and the individual significance of the estimated coefficients on the interaction variables further indicates their importance for explaining the variation in firm international diversification.

As discussed earlier, in the TOBIT framework the estimated coefficient on an interaction variable may not indicate the true magnitude or directional influence of a given moderator variable (i.e., import competition or firm product diversification) in altering the (marginal) effect for a particular globalization variable. To test the moderator hypotheses (H2b and H2c), the true interaction coefficient must be computed and then the directional influence assessed by calculating the total marginal effect for a given explanatory variable at different levels of the moderator variable. The true interaction coefficients associated with Model 2 were calculated at a low, mean, and high value of each moderator variable and in

¹⁹ Variable marginal effects were also calculated but are not reported since the sign and significance of these marginal effects is the same as for the estimated coefficients.

almost all cases were found to be significantly different from zero indicating the existence of an interaction effect.²⁰

Table 3 allows us to examine the nature of the interaction effect between a firm's level of international diversification and each measure of industry globalization by showing the total marginal effect for each industry globalization variable at different levels of the moderator variables. Since all independent variables were standardized, the total marginal effect measures the effect of a one standard deviation change in world industry trade volume or intra-industry trade on the level of international diversification at the indicated value of a given moderator variable (e.g. import competition or firm product diversification). Figures 1-4 expand on this analysis by showing the total marginal effect for a globalization variable over its full range of sample values, and at the low, mean and high value of a moderator variable. In each figure, the vertical line located in the interior of the figure indicates the sample mean of the particular industry globalization variable.

Insert Table 3 and Figures 1-4 About Here

Table 3 shows that the total marginal effect of an increase in intra-industry trade on the level of firm international diversification is significant and positive at the low, mean, and high values of import competition. Table 3 further indicates that the total marginal effect of intra-industry trade on firm international diversification is greater at a high level of import competition than at the mean value of import competition, supporting Hypothesis 2b, that a firm's response to expand its international diversification in response to increased industry globalization as measured by intra-industry trade will be greater, the higher the level of import competition in its core business industry. The total marginal effect of an increase in industry globalization, when measured by world industry trade volume, on firm international diversification is also significant and positive at all three levels of import competition, but the magnitude of this total marginal effect is smaller at a high level of import competition, contrary to Hypothesis 2b. Thus Hypothesis 2b is only supported for industry globalization measured in terms of intra-industry trade.

²⁰ The interaction coefficient between world industry trade volume and international diversification is significantly only at the high value of import competition. The total marginal effect for world industry trade volume is thus calculated with no interaction term at the low and mean values of import competition.

For firm product diversification (Hypothesis 2c), Table 3 shows that the total marginal effect of an increase in world industry trade volume on firm international diversification is positive and significant at the low, mean, and high values of firm product diversification. The total marginal effect of world industry trade volume on firm international diversification is smaller the higher the level of firm product diversification. Similarly, the total marginal effect of an increase in intra-industry trade on firm international diversification is positive and significant at the low, mean, and high values of firm product diversification. The total marginal effect of intra-industry trade on firm international diversification is smaller the higher the level of firm product diversification. These results provide strong support for Hypothesis 2c, that the higher the level of firm product diversification, the smaller (less positive) will be the relationship between the level of firm international diversification and the level of industry globalization.

CONCLUSION

This paper developed a theoretical framework and presented a set of empirical results to address the influence of changing global business conditions, as reflected by the growing globalization of markets and industries, on corporate strategic choice regarding a firm's level of international diversification. Our theoretical framework integrated both industry and firm specific elements to formulate predictions of how changing global business conditions would be expected to influence a firm's international diversification strategy. Prior research, by focusing on the linkage between international diversification and firm performance, has largely ignored how global environmental factors may influence a firm's international diversification decision. Our empirical results, derived in a panel data set of U.S. firms, 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 a higher level of international diversification, and hence a greater reliance on foreign sales. Consistent with our theoretical framework, our empirical results also indicate that both the extent of foreign competition in a firm's core industry, and the extent of a firm's product diversification, moderate the relationship between industry globalization and a firm's level of international diversification. Specifically, higher levels of import competition in a firm's core industry reinforce the positive effect of rising industry globalization, in the form of increased intra-industry trade, on a firm's level of international diversification. In contrast, the extent of a firm's product diversification reduces the positive effect that rising industry globalization exerts on the firm's level of international diversification. This finding provides additional

evidence that international diversification and product diversification represent tradeoffs with respect to expansion by a firm.

Our study also provides evidence that a firm's international diversification strategy is driven by the presence of foreign competition in its home market. A firm operating in a core industry characterized by higher levels of foreign competition, whether from imports or from production by domestic affiliates of foreign companies, is more likely to have a higher level of foreign sales. This is the first study to document that firms faced with growing foreign competition in their home market are likely to increase their level of foreign sales, and are therefore more inclined to compete on a global level. Hence, while prior research has indicated that foreign competition brings in new players with lower cost structures that intensifies the level of competition within a market (Tybout, 2001), our findings go further to suggest that these competitive pressures can serve to make those domestic players who survive foreign competition in their home market more internationally competitive, as reflected in higher levels of foreign sales.

Finally, our results indicate that higher levels of product diversification hamper a firm's ability to increase foreign sales and hence to expand overseas. Our analysis therefore provides evidence to support the prediction from both the resource-based view and transaction cost economics theories that product diversification and geographic diversification are competing modes of expansion for a firm. Our findings therefore also provide evidence for the more specific hypothesis that limits on managerial attention represent a real constraint on a firm's ability to expand into international markets.

This study adds 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 so doing, the study demonstrates the need for a more integrative model of a firm's decision to diversify internationally. By conducting our empirical examination in a panel data set, and estimating our causal model in the framework of the nonlinear TOBIT model, we were able to incorporate both a firm's decision of whether to expand internationally as well as the extent of international diversification if such expansion had already been undertaken. In addition, our analysis of results highlighted an important methodological issue regarding the proper interpretation of interaction effects in nonlinear models such as the TOBIT. The paper therefore also makes a significant methodological contribution in terms of research design and statistical procedure that can serve to guide further work on the increasingly important topic of globalization and its impact on firm strategy.

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Table 1 Descriptive statistics and correlation matrix

Variable ^a	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11
1) International Diversification	0.209	0.224	1.00										
2) Import Competition	0.165	0.177	0.15	1.00									
3) Foreign Domestic Competition	0.165	0.127	-0.01	-0.12	1.00								
4) World Industry Trade Volume	0.279	0.115	0.19	0.35	-0.10	1.00							
5) Intra-Industry Trade	0.693	0.241	0.15	0.08	-0.12	0.24	1.00						
6) Firm Product Diversification	0.224	0.390	0.03	-0.12	-0.06	-0.17	-0.16	1.00					
7) Firm Size	4.253	2.507	0.26	-0.02	-0.16	-0.19	-0.15	0.45	1.00				
8) Firm Performance	0.023	0.440	0.08	0.03	-0.14	-0.02	-0.01	0.11	0.36	1.00			
9) Industry R&D Intensity	0.058	0.053	0.08	-0.16	0.19	0.17	0.25	-0.22	-0.29	-0.15	1.00		
10) Industry Economies of Scale	0.051	0.038	0.06	-0.07	0.16	0.15	0.01	-0.09	-0.13	-0.07	0.19	1.00	
11) World Industry Growth	0.053	0.050	-0.01	-0.03	-0.08	-0.18	-0.04	-0.01	-0.07	-0.01	0.15	0.01	1.00
12) World Industry Trade Barriers	0.034	0.014	-0.04	0.02	0.09	0.09	0.01	-0.06	-0.04	-0.01	-0.05	-0.02	-0.56

$n = 6435$ Correlations whose absolute value exceeds 0.0244 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 the level of firm international diversification

Variable ^a	Model 1	Model 2
Lagged Import Competition	0.039***	0.043***
Lagged Foreign Domestic Production	0.019***	0.022***
Lagged World Industry Trade Volume	0.067***	0.069***
Lagged Intra-Industry Trade	0.051***	0.050***
Lagged Firm Product Diversification	-0.021***	-0.027***
Firm Size	0.150***	0.150***
Lagged Firm Performance	0.027***	0.028***
Industry R&D Intensity	0.037***	0.035***
Industry Economies of Scale	0.017***	0.021***
World Industry Growth	0.010**	0.014***
World Industry Trade Barriers	-0.010**	-0.006
World Industry Trade Volume x Import Competition		-0.013***
Intra-Industry Trade x Import Competition		0.015***
World Industry Trade Volume x Product Diversification		-0.023***
Intra-Industry Trade x Product Diversification		-0.008**
Constant	0.133***	0.131***
Log-Likelihood	-1905	-1875
Pseudo-R ²	0.316	0.333
Chi-square statistic for overall model significance ^b	1797.5***	1906.7***
Chi-square statistic for significance of interactions ^c	---	79.44***

$n = 6435$ ** $p < 0.05$, *** $p < 0.01$

^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.

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

Moderator Variable	Level	Value of Moderator ^a	Total Marginal Effect ^b	
			World Industry Trade Volume	Intra-Industry Trade
Import Competition	Low	0.0 ^c	0.043***	0.022***
	Mean	0.165	0.047***	0.034***
	High	0.342	0.042 ***	0.048***
Firm Product Diversification	Low	0.0 ^c	0.072***	0.041***
	Mean	0.224	0.053***	0.034***
	High	0.614	0.035***	0.027***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

^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 each moderator variable.

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

Figure 1 Interaction of Import Competition and World Industry Trade Volume on Firm International Diversification.

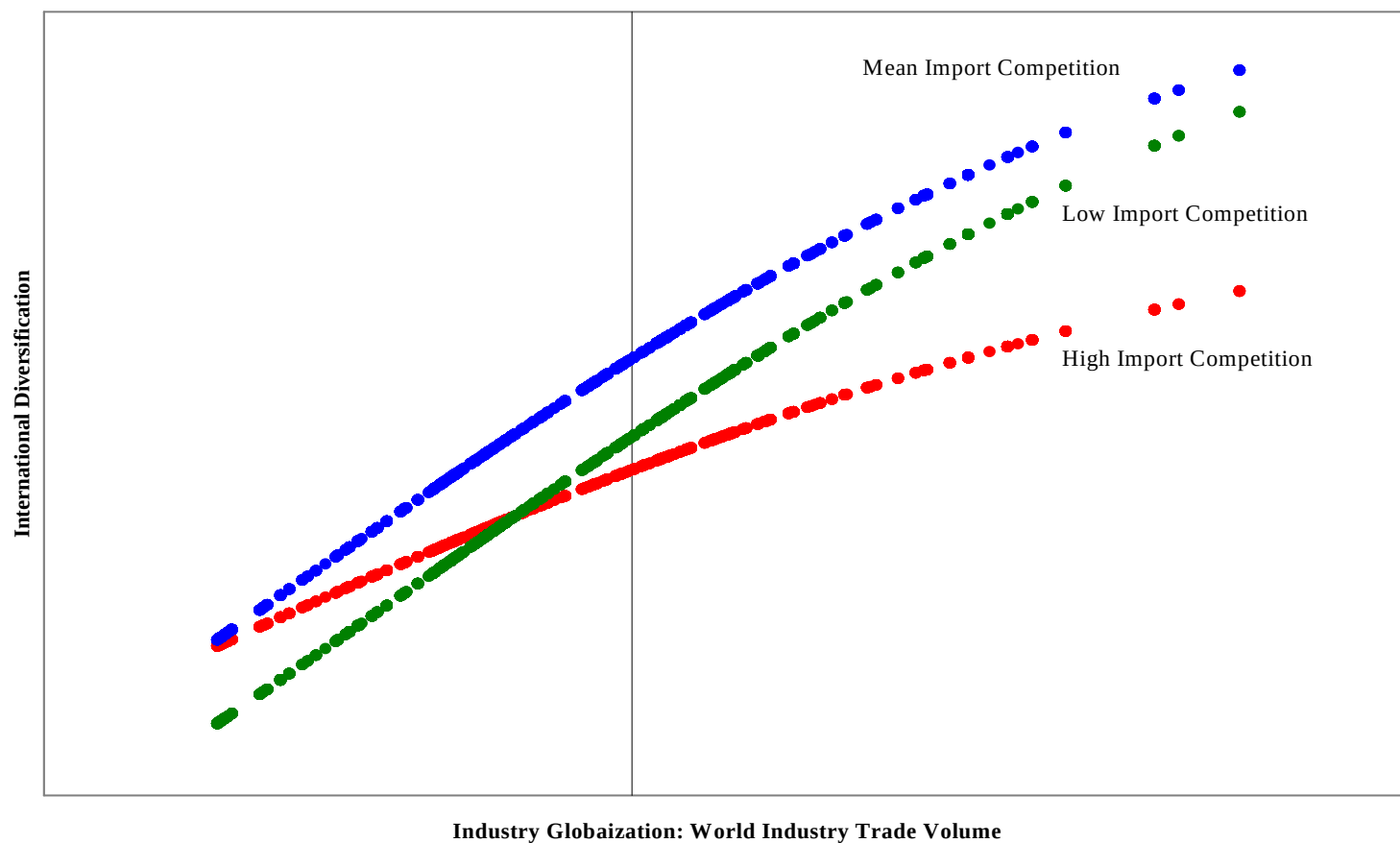


Figure indicates values of the total marginal effect for a change in world industry trade volume on firm international diversification over sample values of world industry trade volume and at three values of import penetration. The vertical line in the figure indicates the sample mean of world industry trade volume.

Figure 2 interaction of Import Competition and Intra-Industry Trade on Firm International Diversification

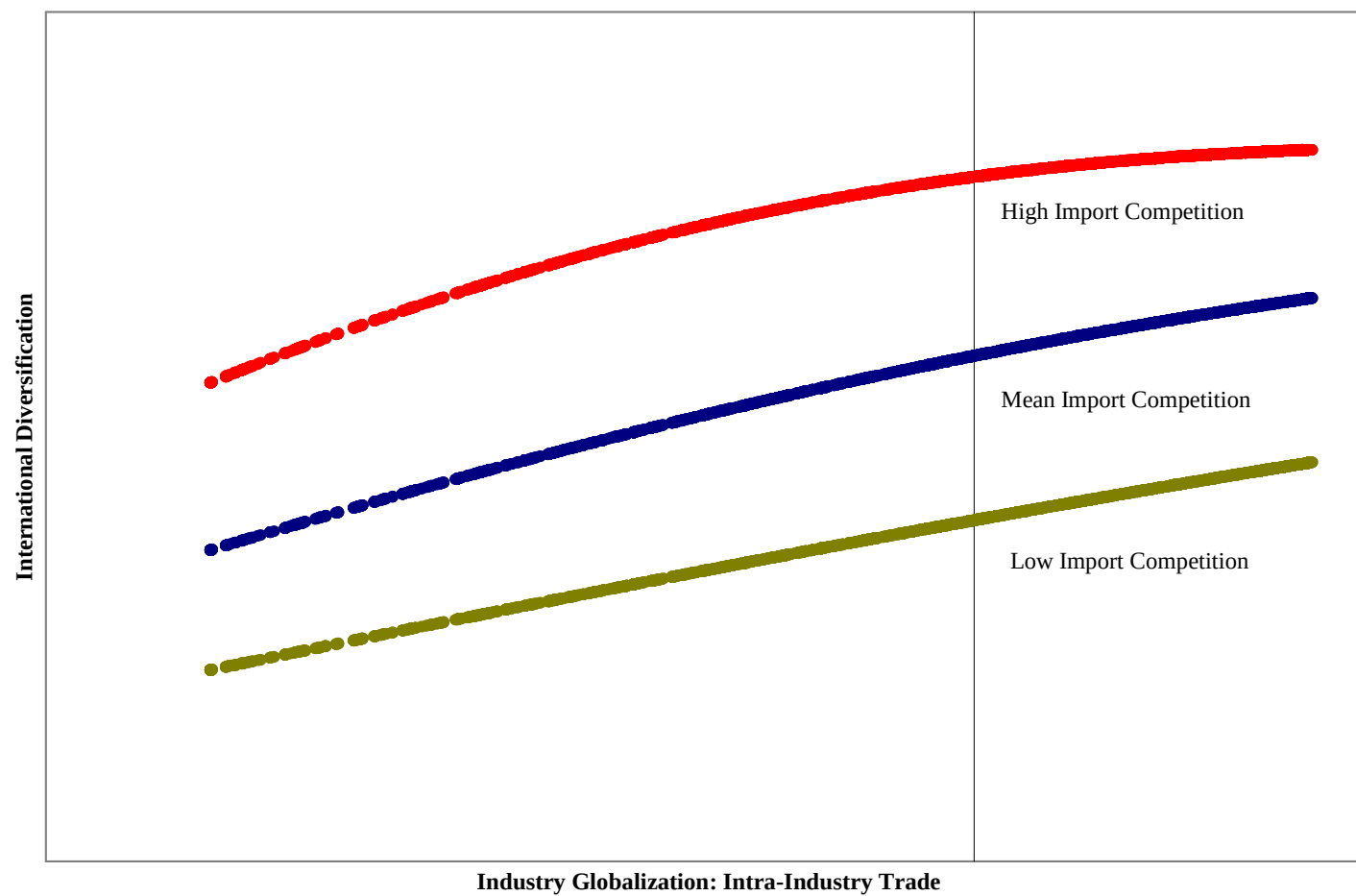


Figure indicates values of the total marginal effect for a change in intra-industry trade on firm international diversification over sample values of intra-industry trade and at three values of import penetration. The vertical line in the figure indicates the sample mean of intra-industry trade.

Figure 3 Interaction of Firm Product Diversification and World Industry Trade Volume on Firm International Diversification

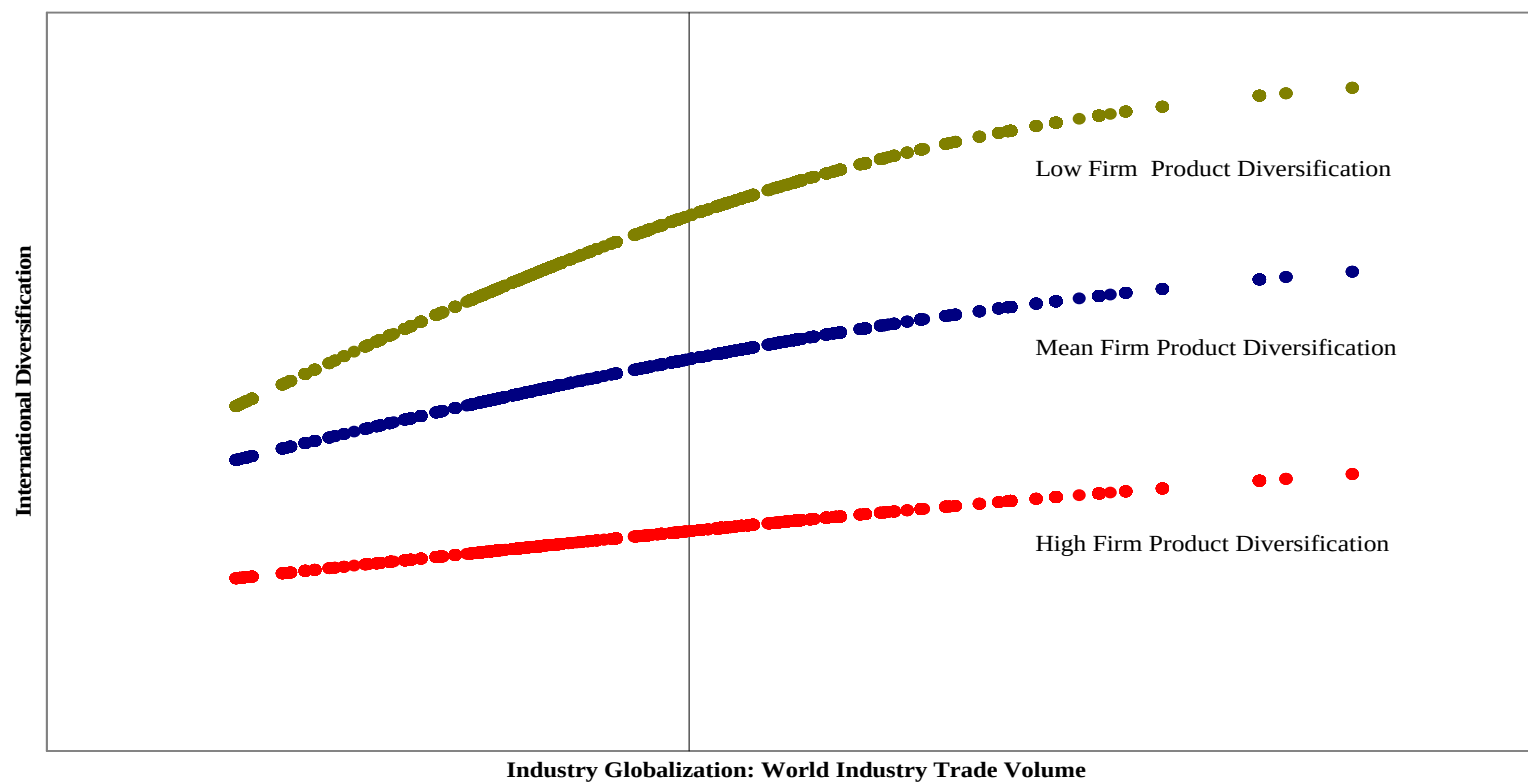


Figure indicates values of the total marginal effect for a change in world industry trade volume on firm international diversification over sample values of world industry trade volume and for three values of firm diversification. The vertical line in the figure indicates the sample mean of world industry trade volume.

Figure 4 Interaction of Firm Product Diversification and Intra-Industry Trade on Firm International Diversification

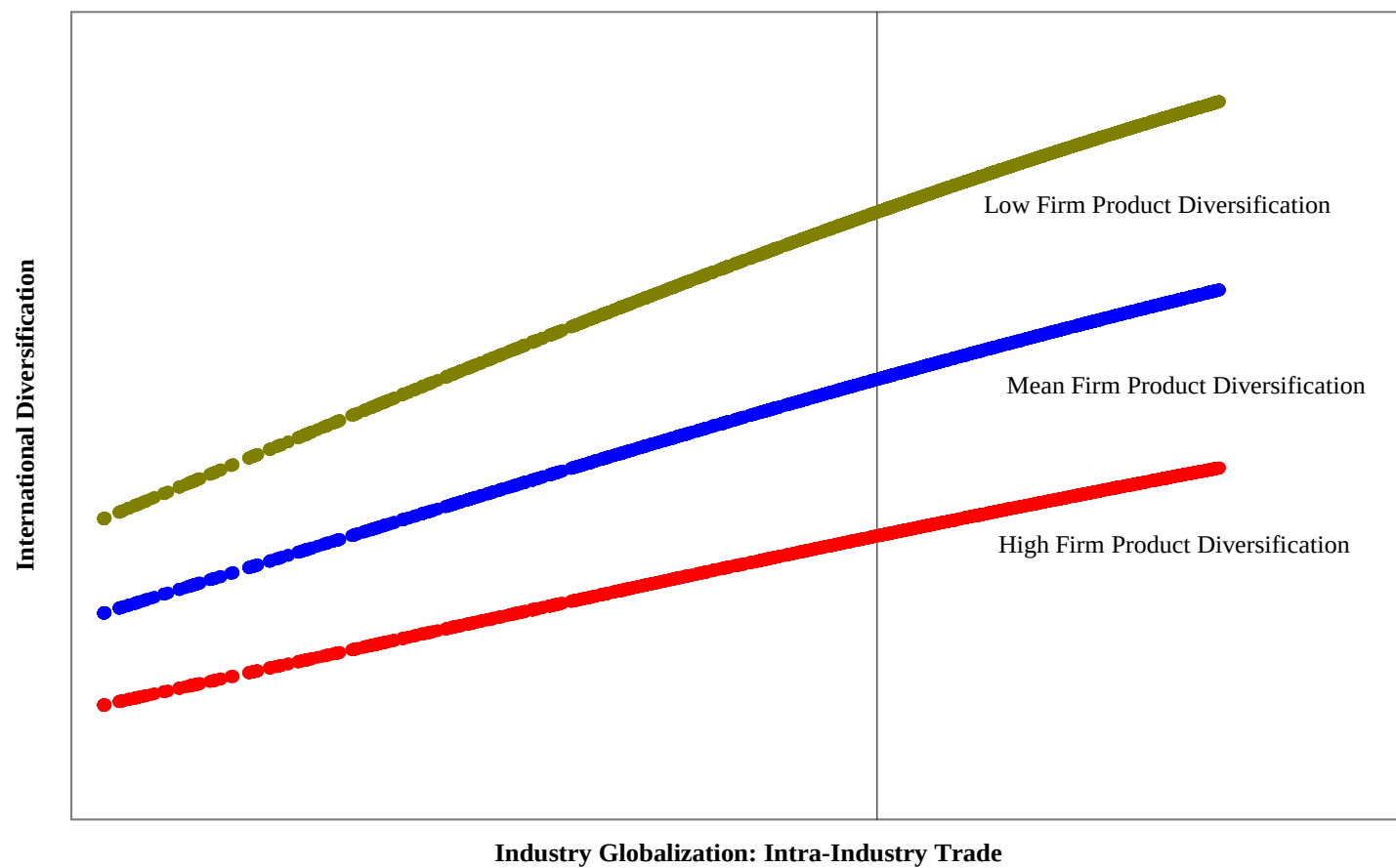


Figure indicates values of the total marginal effect for a change in intra-industry trade on firm international diversification over sample values of intra-industry trade and for three values of firm diversification. The vertical line in the figure indicates the sample mean of intra-industry trade.