

Martínez-Campillo, A. & Fernández-Gago, R. (2011): "What about the effects of increasing diversification in response to environmental transformations? The case of Spain", *Transformations in Business & Economics*, 11, nº 25, (154-166).

**WHAT ABOUT THE EFFECTS OF INCREASING DIVERSIFICATION IN RESPONSE
TO ENVIRONMENTAL TRANSFORMATIONS? THE CASE OF SPAIN**

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ABSTRACT: Previous empirical studies that analyze the impact of diversification on firm performance in the Spanish economy are scarce and contradictory, which impedes the generation of widely accepted conclusions. This paper aims to provide additional information on the nature of the diversification-performance relationship in Spain during the period 1997-2001, which is characterized by important transformations in the competitive environment and hence in the strategic tendency of firms. After using Heckman's two-stage method on a sample of 236 large Spanish firms, results indicate that increasing diversification across the low to moderate levels had a positive and significant effect on firm growth and profitability over this period. By comparing these results with those previously obtained for Spanish firms, it may be concluded that the level of diversification and their consequences vary with time and contextual changes.

KEYWORDS: Spain, environmental transformations, corporate diversification, firm growth, firm profitability

JEL CLASSIFICATION: L10, L25, L35

(*) A preliminary version of this paper was accepted for presentation at the International Conference on Applied Business and Economics (ICABE)2008, held in Thessaloniki, Greece, on 2-4 October 2008. The abstract appears in the Proceedings of the Conference with the title "The Impact of Diversification on Firm Growth and Profitability in the Spanish Economy: New Evidence in a New Business Context" (p.84), available for download at http://www.icabe.gr/downloads/ICABE_2008_PROC.pdf

WHAT ABOUT THE EFFECTS OF INCREASING DIVERSIFICATION IN RESPONSE TO ENVIRONMENTAL TRANSFORMATIONS? THE CASE OF SPAIN

Introduction

The diversification strategy is defined as “*the entry of a firm into new lines of activity, either by processes of internal business development or acquisition, which entails changes in its administrative structure, systems, and other management processes*” (Ramanujan and Varadarajan, 1989: 525). Researchers from different areas have sought to explain the antecedents of this strategy and its relationship with firm performance. In particular, this last question is the topic of extensive studies for leading developed countries¹ (Denis *et al.*, 1997, 1999; Campa and Kedia, 2002; Kim *et al.*, 2004; Desai *et al.*, 2005; Miller, 2004, 2006), but evidence hardly exists for other more recently developed countries. Thus, considering the importance that researchers from other nations (such as USA, Canada, UK, France, Germany or Japan) are giving to the study of the performance effects of diversification, and given that previous research analyzing the diversification-performance relationship in the Spanish economy is scarce, contradictory and not too recent (Suárez-González, 1994; Menéndez and Gómez, 2000; Ramírez and Espitia, 2002), it may be interesting to provide new empirical evidence on this issue in Spain, whose business environment is different from the one examined in most early works.

Although Spanish firms have traditionally shown a low level of diversification (Ramírez and Espitia, 2002; Sánchez-Bueno *et al.*, 2006), contextual changes that have taken place in recent years have led to an extremely competitive environment, in which diversification constitutes one of the strategies that firms may choose to adapt and survive (Simanavičienė and Dagilienė, 2003; Cottrel and Nault, 2004; Colpan and Hikino, 2005). As a result, Spanish firms have indeed increased their levels of diversification in the last decade², which in turn may have had varying effects on firm performance. Also, the fact that Spanish companies are smaller in size and less diversified than those in most leading developed countries may lead to insights different from the ones found in previous research in other countries.

For these reasons, the main goal of this study is to examine the nature of the diversification-performance relationship in the Spanish economy in a new context, characterized by important transformations in business environment and hence in the strategic tendency of firms. To that end, since researchers have raised serious questions about the methodology of preceding studies linking diversification strategy to firm performance (Palich *et al.*, 2000; Miller, 2006), this study uses Heckman’s (1979) two-

¹ Despite that an extensive research examines the diversification-performance relationship in leading developed countries, the empirical evidence remains inconclusive.

² Despite this tendency, Spanish firms still show a significantly lower level of diversification than those from the rest of the European developed countries (Sánchez-Bueno *et al.*, 2006).

stage method³. This statistical technique allows the proper correction of some econometric problems traditionally associated with the estimation of diversification effects, such as sample selection bias and endogeneity.

This paper contributes to the existing literature in three important ways: First, the study seeks to advance the state of the art on the diversification-performance relationship in Spain by adding to the limited and contradictory empirical research existing to date (Ramírez and Espitia, 2002). Moreover, it provides additional information on this topic by analyzing for the first time the performance effects of the initial decision to diversify; that is, when firms increase their number of business segments from one to two or more. Second, the study considers that the nature of the diversification-performance relationship may vary with contextual changes within a country across time (Mayer and Whittington, 2003; Chakrabarti *et al.*, 2007; Singh *et al.*, 2007). For this reason, it attempts to predict the performance effects of diversification over the last years based on the new strategic tendency of Spanish firms derived from changes in business environment. Given that the relationship between diversification and performance seems to be influenced by contextual changes, it may be interesting to provide new empirical evidence for Spain in a different business context. Third, the study also contributes from a methodological perspective by applying Heckman's two-stage method to control for possible endogeneity and sample selection biases in the diversification-performance relationship (Miller, 2006).

The structure of the article is as follows. Section 2 introduces and justifies the hypothesis proposed as regards the impact of diversification on firm performance in Spanish firms. Section 3 contains the data and empirical methodology. Section 4 reports the results. The final section offers some concluding remarks.

1. Theory and hypothesis

1.1 Antecedents

The analysis of diversification effects on firm performance is one of the most widely studied and debated topics in the academic and business world. However, the nature of the diversification-performance relationship remains largely unsolved to date insofar as it depends on the benefits and costs associated with this strategy. It is argued that diversification can be driven by a range of perceived benefits associated with market power advantages (Scherer, 1980), greater efficiency of internal capital markets (Williamson, 1985; Stein, 1997), scope and scale economies from sharing resources and capabilities across different businesses (Fraquelli *et al.*, 2004; Tanriverdi and Venkatraman, 2005), increased debt capacity (Lewellen, 1971), tax and other financial advantages (Majd and Myers 1987; Berger and Ofek, 1995), and risk reduction (Lubatkin and Chatterjee, 1994). In contrast to diversification, single-business strategy does not provide these benefits.

³ To our knowledge, there is not any published study applying Heckman's method to estimate the nature of the diversification-performance relationship in Spain. However, recent works have used it to analyze such a relationship in the context of the American economy (Campa and Kedia, 2002; Villalonga, 2004; Miller, 2006).

Nonetheless, as the diversification degree increases the associated costs also escalate. The main potential cost linked with a higher level of diversification is the exacerbated managerial agency problem. Indeed, diversification may allow managers to increase their compensation and status in the business community, to reduce their personal employment risk and to become entrenched by managing this strategy in a way consistent with their own skills (Denis *et al.*, 1997, 1999). In particular, these costs may be described in terms of misallocation of funds due to cross-subsidization of failing businesses (Meyer *et al.*, 1992), internal power struggles generated by the allocation of resources between different divisions (Rajan *et al.*, 2000), inefficient investments in businesses with poor opportunities (Stulz, 1990) and information and incentive problems between corporate headquarters and division managers (Harris *et al.*, 1982), or between managers and external investors (Hadlock *et al.*, 2001). Additional costs may also arise due to the increase in coordination and control problems across businesses (Hoskisson and Hitt, 1988).

Because of these myriad benefits and costs, it is difficult to predict the net impact of diversification strategy on firm performance. This may explain why early research on the diversification-performance relationship does not show a consistent pattern in results. A review of the literature indicates four sets of findings to be prevalent. The first set of studies reports a positive effect of this strategy on firm performance (Rhoades, 1973; Campa and Kedia, 2002; Villalonga, 2004). The second set of findings concludes a negative relationship between diversification and performance (Berger and Ofek, 1995; Lamont and Polk, 2002; Singh *et al.*, 2007). A third set of studies finds no significant relationship between both variables (Gort, 1962; Palepu, 1985; Menéndez and Gómez, 2000). Finally, the fourth set of findings reports that the diversification-performance relationship is not linear, but curvilinear (Grant *et al.*, 1988; Ramírez and Espitia, 2002; Mayer and Whittington, 2003).

In this clearly contradictory analysis framework, a study by Palich *et al.* (2000) brings a degree of clarity by using meta-analytic data drawn from 55 previously published works. This study revises and synthesizes mayor theoretical perspectives and empirical studies on the subject and proposes three theoretical models to explain the nature of the diversification-performance relationship: the linear model and two curvilinear models; the inverted-U model and the intermediate model.

The *linear model* is based on the premise that diversification and performance are linearly and positively related (Arnould, 1969; Markham, 1973; Rhoades, 1973). Thus, under this model it is considered that unrelated diversification outperforms related diversification, while this last strategy performs better than single-business strategy. This position rests mainly upon the assumptions derived from the perspectives of market power and internal market efficiency (Scherer, 1980).

The *inverted-U model* posits that related diversification is better than unrelated diversification and single-business strategies in terms of firm performance (Grant *et al.*, 1988; Palich *et al.*, 2000; Ramírez and Espitia, 2002; Mayer and Whittington, 2003). The main theoretical argument suggesting the superiority of a moderate level of diversification focuses on advantages derived from scope and scale economies, since the

firm is able to distribute the cost of an asset already capitalized by spreading its use across multiple linked businesses (Markides and Williamson, 1994; Fraquelli *et al.*, 2004; Tanriverdi and Venkatraman, 2005). However, this model argues that the marginal costs of diversification increase rapidly as the diversification hits high levels because of problems derived from managing an increasingly disparate portfolio of businesses, as well as control and effort losses due to increased shirking, coordination and administrative costs, and internal capital market inefficiencies (Grant *et al.*, 1988). Thus, this model posits that firms experience some optimal level of diversification, with performance decrements to either side of that point of maximization.

Finally, the *intermediate model* notions that diversification yields positive but diminishing returns beyond some point of optimization (Markides, 1992). A diversifying firm will first apply its excess assets in the closest market it can enter. If excess capacity remains, the firm will enter markets even further afield. But as assets are applied in more and more distant fields, they lose their competitive advantage and thus earn lower profits (Wernerfelt and Montgomery, 1988). This implies that the relation between diversification and its marginal benefits is a decreasing function (Grant and Jammine, 1988). Therefore, under this model it is assumed that diversification performs better than single-business strategy, although both related and unrelated diversification may have a similar impact on firm performance, due to the costs of exploiting relatedness between businesses and the unique benefits derived from unrelated strategy (Nayyar, 1992).

1.2 The diversification-performance relationship in the Spanish economy

Spanish firms have traditionally been characterized by a low level of diversification (Ramírez and Espitia, 2002; Sánchez-Bueno *et al.*, 2006). However, during the last decade the entry into new lines of activity has become a common practice in business reality, as well as being one of the most important alternatives for corporate growth, along with internationalization and innovation. The main reasons behind this change in the strategic tendency of firms seem to be the following: the significant growth potential of the Spanish economy over this period (Ramírez and Espitia, 2002), and the fact that the competitive environment in which Spanish firms operate has changed dramatically over the last ten years. Indeed, they have been immersed in an extremely fierce world, determined basically by the globalization of markets and a growing emphasis on knowledge and innovation (Sánchez-Bueno *et al.*, 2006). In this new business context, it is of paramount importance that companies understand and adapt to these environmental transformations if they want to survive. In this regard, diversification is a central phenomenon for the adaptation, survival, and growth of firms in a highly competitive environment; that is, it is a critical strategy for continued existence of firms (Simanavičienė and Dagilienė, 2003; Cottrel and Nault, 2004; Colpan and Hikino, 2005).

A recent study by Sánchez-Bueno *et al.* (2006) notes that during the period 1993-2003, in order to adapt to the new business context, large Spanish firms have shown a marked decrease in the single-business strategy (-15 percent), the predominance and stability of the dominant-business strategy (44 percent of them), and a substantial increase in related diversification (+14 percent). Indeed, “in this period of profound changes in the

competitive environment, the most frequent moves are those from single-business strategy to dominant-business strategy and from these two strategies to related diversification” (Sánchez-Bueno *et al.*, 2006: 28), while unrelated diversification hardly has representation in the whole decade⁴. Thus, the panorama described reveals that in recent years large Spanish firms have shown a clear tendency towards greater diversification, especially towards moderate levels of diversification⁵.

Given that the nature of the diversification-performance relationship varies widely with changes in context over time (Geringer *et al.*, 2000; Mayer and Whittington, 2003; Chakrabarti *et al.*, 2007; Singh *et al.*, 2007), such variation in the strategic tendency of Spanish firms derived from environmental transformations may have had an impact on subsequent performance. In particular, Palich *et al.* (2000: 164) conclude that “*positive effects (on firm performance) occur as firms shift from a single-business strategy to a related diversification strategy*”. Indeed, whichever of the three theoretical models proposed by these researchers -linear, inverted-U and intermediate- allow us to deduce that diversification is positively related to performance across the low to moderate range of diversification. Firms with low level of diversification do not have multiple businesses, so they may not enjoy economies of scope and other important advantages that may accompany diversification, with the consequent negative implications for performance. However, firms with moderate levels of diversification may generate cost advantages derived from sharing resources and activities between businesses. Moreover, these firms may also benefit from learning curve efficiencies, intra-firm product/process technology diffusion, and restricted access to factors of production that are necessary for operations stemming from a specific industry (Markides and Williamson, 1994; Tanriverdi and Venkatraman, 2005).

In addition, the study by Palich *et al.* (2000: 164) adds that these positive effects of moderate levels of diversification on firm performance “*are detectable as a linear effect in samples restricted away from the high end of diversification*” –that is, in samples that

⁴ The study by Sánchez-Bueno *et al.* (2006) uses Rumelt’s (1974) classification of diversification strategies, based on the specialization and related ratios: *Single-business strategy* implies that the proportion of a firm’s revenue attributable to its largest single business is 95% or more in a given year. *Dominant-business strategy* implies that the proportion of a firm’s revenue attributable to its largest single business is 70% or more but less than 95%. *Related diversification* implies that the proportion of a firm’s revenue attributable to its largest single business is less than 70% and majority of businesses are related to each other (the proportion of a firm’s revenue attributable to its largest group of related businesses is 70% or more). *Unrelated diversification* implies that the proportion of a firm’s revenue attributable to its largest single business is less than 70% and majority of businesses are not related to each other (the proportion of a firm’s revenue attributable to its largest group of related businesses is less than 70%).

⁵ As Palich *et al.* (2000: 158) note “*level and type of diversification are conceptually distinct, but we do not differentiate them here... In support to our approach, empirical research consistently indicates that type of diversification is strongly associated with continuous data representing level of diversification*”. For the purpose of maintaining homogeneity and allowing comparisons, in this paper is also considered that single-business strategy is equivalent to low diversification, the range from dominant-business strategy to related strategy is equivalent to moderate diversification, and unrelated strategy is equivalent to high diversification.

hardly include firms with high levels of diversification⁶. With these arguments in mind, considering the strategic tendency shown by large Spanish firms during the last decade in response to environmental transformations, the study presents the following hypothesis in order to test the linear model over the period analyzed⁷:

H₁: Diversification strategy has a positive linear effect on firm performance.

2. Methods

2.1 Population

The population for this study comprises a set of large firms operating in Spain over the period from 1997 to 2001⁸. Specifically, those Spanish public companies with total sales greater than three million euros per annum and more than 100 employees during this time period were chosen. The Dun&Bradstreet Directory yields a total of 3,655 firms fulfilling these criteria. However, the question of evaluating diversification effects is best broached by focusing on firms when they decide to diversify for the first time; that is, when they increase their number of business segments from one to two or more (Miller, 2004; Villalonga, 2004). For this reason, we restrict the research to firms reporting only one business segment at the four-digit SIC level in 1997, excluding all companies specializing in financial services, regulated utilities, government and non-classifiable establishments. After applying these restrictions, the final population consists of 1,256 single-business firms in 1997. Once the different annual editions of the Dun&Bradstreet Directory were consulted, it was possible to observe that 520 companies made the decision to diversify during the 1998-2001 period and 736 remained specialized⁹.

2.2 Sample selection

The measurement of the level of diversification the year in which firms diversify for the first time between 1998 and 2001 takes into account both the number of business

⁶ The findings of the study by Palich *et al.* (2000: 164) expressly state that “*Diversification appears to have an inverted-U curvilinear relationship with performance: positive effects occur as firms move from a single-business strategy to a related diversification strategy (detectable as a linear effect in samples restricted away from the high end of diversification), but negative effects occur as firms move from a related strategy to an unrelated strategy (detectable as a linear effect in samples restricted away from the low end of diversification)*”

⁷ The other relations that emerge from the review of the literature are considered in the alternative hypothesis.

⁸ The analysis of the period between 1997 and 2001 is justified by three main reasons: (1) the lack of studies that examine the impact of diversification on Spanish firm performance since 1996; (2) the public availability, when the population was selected, of data on the number of businesses in which large Spanish firms operate until the year 2001; (3) the fact that important contextual changes with potential to affect the diversification-performance relationship have taken place during such period.

⁹ Dun&Bradstreet Directories annually offer the four-digit SIC codes for the 50,000 largest Spanish firms.

segments at the four-digit SIC level in which they operate, which is taken from the Dun&Bradstreet Directory, and the relative importance of each business segment to the firm's sales, which is not publicly available to Spanish firms. Thus, it was necessary to carry out a survey to collect this information about the year of diversification. Specifically, a questionnaire was sent to the CEOs of the 520 diversifying firms in the population, which was completed between May and July 2003¹⁰. A valid response rate of 22.7 percent provides a sample of 118 diversifying companies (sampling error was 8.1 percent with a 95 percent confidence level).

The distribution of these 118 firms as regards the diversification strategy followed (dominant-business, related diversification and unrelated diversification) is as follows¹¹: Starting from all firms pursue a single-business strategy in 1997, 50.8 percent of them shift to a dominant-business strategy (60 firms), 40.6 percent to related diversification (48 firms), and only 8.4 percent to unrelated diversification (10 firms)¹². Moreover, it is possible to arrive at the same conclusion as Sánchez-Bueno *et al.* (2006) regarding the strategic changes of specialized firms: the most frequent moves are those from single-business strategy to dominant-business strategy and related diversification; that is, towards moderate levels of diversification. As a result, it is possible to conclude that the sample of diversifying firms used in this study does not present a high level of diversification; that is, it is a sample restricted away from the high end of diversification.

Recent literature indicates that “*the confidence with which one can draw conclusions from empirical studies of strategic phenomena is significantly limited if the sample is constructed of firms that have experienced the phenomenon under study*” (Jensen and Zajac, 2004: 512). For this reason, each diversifying firm from the sample was paired with one of the 736 specialized firms from the population to avoid sample selection bias. Matching criteria were proposed by Miller (2004) for a similar purpose: sharing the same principal business at the two-digit SIC code level and having a similar size (within 70-130 percent of sales and/or employees) in the year prior to the diversification event.

¹⁰ These 520 firms were specialized in 1997 and they moved from a single-business strategy to a multi-business strategy during the period 1998-2001. Given that in this study the level of diversification is measured the year *t* in which the firm diversifies for the first time over this period, four different versions of the questionnaire were mailed: The *version 1* was sent to the firms that diversified for the first time in 1998 and their CEOs had to specify the proportion of sales in each business segment at the four-digit SIC level with respect to total sales in 1998; *versions 2, 3 and 4* were sent to the firms that diversified for the first time in 1999, 2000 and 2001, respectively, and their CEOs had to specify the proportion of sales in each business segment at the four-digit SIC level with respect to total sales in 1999, 2000 and 2001, respectively. As well as inquiring about this question, the questionnaire also asked for information required in the framework of other research.

¹¹ The diversification strategy followed by each firm in the sample have been identified through Rumelt's classification (see footnote 4), as in the works by Palich *et al.* (2000), Suárez-González (1994) and Sánchez-Bueno *et al.* (2006), for the purpose of maintaining homogeneity. As in these previous studies, the largest group of related businesses has been also determined within a two-digit SIC industry.

¹² As regards unrelated diversifiers, although Rumelt's related ratios are less than 70%, they are not too distant from this threshold that allows differentiating between related and unrelated diversification (see footnote 4).

After applying these criteria, the final sample consists of 236 firms, distributed equally between diversifying and specialized companies.

2.3 Independent variable

The entropy index (Jacquemin and Berry, 1979; Palepu, 1985) was used to measure the level of diversification the year t in which firms diversify for the first time between 1998 and 2001. This index is defined as follows:

$$DIV = \sum_{i=1}^n P_i \ln(1/P_i) \quad (1)$$

where n is number of the firm's business segments at the four-digit SIC level and P_i is i th business segment's sales divided by the firm's total sales. The entropy measure is zero for single-business firms and it increases with greater diversification. The choice of this index is justified because previous research concludes that "*the high degree of correspondence between the continuous (level of diversification) and categorical (type of diversification) measures can be interpreted as a "plus" for SIC-based diversification measures*" (Montgomery, 1982:305). As a result, on the base of the entropy index it is possible to consider that a low level of diversification is equivalent to a single-business strategy, a moderate level of diversification is equivalent to the range from dominant-business strategy to related diversification, and a high level of diversification is equivalent to unrelated diversification. Also, the entropy index has been reported as superior basically because it combines objectivity, content and construct validity, and simplicity (Kim *et al.*, 2004).

2.4 Dependent variables

The effects of diversification on firm performance were measured in terms of growth and profitability (Geringer *et al.*, 2000; Palich *et al.*, 2000; Kim *et al.*, 2004). *Firm growth* was measured by sales growth¹³. In particular, after estimating the average sales for three-year pre- and post-diversification periods, the percentage change in average sales between the two periods was calculated. *Firm profitability* was measured by the variation in return on assets (ROA)¹⁴. This variable was also quantified as percentage change in average ROA between the three-year pre- and post-diversification periods. The averages for the three years prior and following to the diversification event were used to control for any seasonality in firms' sales and ROA figures. Performance data were taken from the SABI database.

¹³ Geringer *et al.* (2000) provide a lengthy argument in favor of sales-based measures to avoid the effects of differential measures of asset valuation.

¹⁴ ROA was chosen as an accounting-based measure of firm profitability because this indicator remains the most widely used performance measure in the strategy literature (Kim *et al.*, 2004). Although market value-based measures may be considered more complete indicators of the effects of corporate strategies, their use in this study would have restricted the population to firms that were quoted on the Spanish Stock Market. The limited nature and uneven distribution across industries of our national Stock Market advised against this approach.

2.5 Control variables

The analysis included the following control variables that have demonstrated significant effects on firm performance independent of diversification: (a) two variables to identify the corporate governance characteristics of companies the year of diversification (Mayer and Whittington, 2003): first, one to account for the *corporate control*, that takes a value of 1 if firms are owner-controlled (external owners have 5 percent or more of the outstanding shares) or owner-manager controlled (CEOs have 2 percent or more of the outstanding shares), and a value of 2 if firms are manager-controlled (external ownership is diffused -less than 5 percent- and CEO ownership is limited -less than 2 percent-)¹⁵; and, second, another one to control the *proportion of insiders on the board of directors*; (b) two firm-level economical variables, such as *size* (log of total assets) and *investment* (capital expenditures/sales), to abstract from any performance differences due to these internal factors (Palich *et al.*, 2000; Campa and Kedia, 2002; Villalonga, 2004). We calculate 3-year pre-diversification averages for these variables; (c) a dummy variable that indicates whether firms develop *export activity* the year of diversification, since firms that operate in more than one country are able to reap benefits that are not available to purely domestic firms (Palich *et al.*, 2000); and (d) one industry-level variable such as *profitability* (industry ROA at the four digit SIC level), since prior research has shown industry effects to have an important impact on variation of firm performance (Campa and Kedia, 2002; Villalonga, 2004). We calculate 3-year pre-diversification average for this variable. All necessary data to construct control variables were taken from the SABI database.

3. Results

Table 1 presents means, standard deviations and correlation coefficients for all variables used in this study. As shown, the estimated correlation between diversification and firm growth is 0.33 and, when diversification is combined with change in ROA, it is equal to 0.25. Thus, it is possible to conclude that the association between diversification and firm performance is not too strong. Although some variables in regression equations show a high correlation, the examination of variance inflation factors (VIFs) indicates no evidence of multicollinearity.

[Table 1]

Standard regression techniques are not able to control for endogeneity bias from self-selection associated with studying the diversification-performance relationship. One solution is to apply Heckman's (1979) two-stage method. Specifically, this study applies a hierarchical regression analysis in order to test the performance effects of the level of diversification in the second stage of Heckman's method¹⁶. Table 2 summarizes

¹⁵ This criterion is also followed by Desai *et al.* (2005) to account for the corporate control when analyzing the performance effects of diversification.

¹⁶ Results of first-stage probit regression predicting propensity to diversify are reported in the Appendix I, which reveals significant relationships for several variables with the choice to diversify. The *Inverse Mills Ratio* (λ_i) calculated using estimates obtained from this selection equation is introduced as a control variable in regression equations.

regression results on the relationship between diversification and firm growth. All models indicate that the coefficient of the λ_i variable is not significant, indicating the absence of sample selection bias. Results for control variables are reported in Model 1. As shown, the proportion of insiders on the board of directors and industry profitability have a significant relationship to sales growth, explaining 11.7 percent of the variance ($p < 0.05$). Model 2 reflects the linear effect of diversification degree. As predicted, the diversification strategy by itself appears to have a substantial positive impact on firm growth ($p < 0.001$). In particular, the addition of the diversification variable in Model 2 contributes significantly to the prediction of sales growth, producing a significant ΔF equal to 12.860 and explaining an additional 9.3 percent of the variance ($p > 0.001$). The quadratic term of diversification is incorporated in Model 3 and it also makes a significant contribution ($p > 0.001$). As shown, both linear and quadratic coefficients are positive and significant¹⁷. Thus, this result does not allow demonstrating that the diversification-growth relationship is linear. Also, given that the diversification variable (D_i) may only take positive values, these results do not provide support for curvilinear models either. Specifically, the results obtained suggest that the net positive effect of diversification on sales growth is a greater than linear increase. Thus, the findings provide only partial support for Hypothesis 1 when performance is measured in terms of firm growth.

[Table 2]

Table 3 contains the results of the regression estimating the impact of diversification on firm profitability. Sample selection bias was not detected here either. Model 1 includes the control variables. The coefficients for corporate control, the proportion of insiders on the board of directors, and export activity are significantly associated with change in ROA. Specifically, these variables explain 39.3 percent of the variance ($p > 0.001$). In Model 2, the linear term of diversification was added. This variable only explains an additional 1.9 percent of the variability in change in ROA and the coefficient suggests that it positively and significantly affects firm profitability ($p > 0.05$). Model 3 includes the quadratic term of diversification as well. As shown, its coefficient is not statistically significant. This means that the diversification-profitability relationship is not curvilinear, but linear. Therefore, although the effect size is not quite as strong as expected, the results obtained offer support for Hypothesis 1 when performance is measured in terms of firm profitability.

[Table 3]

Discussion and conclusions

The main purpose of this study is to provide new empirical evidence on the impact of diversification on firm performance by using a sample of 236 large Spanish firms over the 1997 to 2001 period. The choice of this time period is interesting in that it allows us to consider the new conditions of the environment in which firms have operated over the

¹⁷ The interpretation of quadratic models is highly dependent on the context and the nature of the variables in the equation.

last decade and, hence, the strategic changes that they have made with the aim of adapting to such conditions. To that end, the study justifies and tests one hypothesis that proposes that the diversification strategy has a positive linear effect on firm performance during the period of study. This hypothesis is tested by using Heckman's two-stage method and measuring firm performance in terms of growth and profitability.

The results obtained only provide a partial support for our hypothesis when performance is measured in terms of firm growth. So, they indicate that this corporate strategy has positively and significantly influenced sales growth. During the period of study, the Spanish economy had strong growth potential and the diversification strategy seems to have been one fundamental strategy for exploiting such potential and increasing firm size. Specifically, results confirm that the change from low to moderate levels of diversification constitutes an adequate mean to achieve sales growth, which allows firms to capture competitive advantages targeted at markets-based expansion. Previous studies such as Grant *et al.*, (1988), Tallman and Li (1996), Wilhelmsson and McQueen (1999), and Geringer *et al.* (2000), by using SIC code-based measures of level of diversification on British, American, Swedish and Japanese samples respectively, also find that a moderate level of diversification is positively related to sales growth¹⁸. However, contrary to what we expected, our results show that increasing diversification is not associated with proportional increases in sales growth, but with exponential increases. Thus, despite our sample is indeed restricted away from the high end of diversification, this finding does not provide support for the linear model (Palich *et al.* 2000). Curvilinear models are not supported either. The particular characteristics of the business context in Spain over the period of study could justify these results. Specifically, the existence of an extremely competitive business environment and the fact that Spanish firms are smaller in size and hence less competitive at international level than companies in most leading developed countries, could well explain why increasing diversification of large Spanish firms has led to a greater sales growth than would be expected. Sales growth represents the firm's success in its markets and it is an inherent goal of any company in a highly competitive environment; that is, a key strategic goal to improve the competitive position in markets, survive, and thrive.

In contrast, our hypothesis receives total support when performance is measured in terms of firm profitability. On the one hand, results have demonstrated that the impact of diversification on change in ROA has been positive and significant. Over the period analyzed, in order to adapt to the new business environment, large Spanish firms showed a clear tendency towards greater diversification, especially towards moderate levels of diversification (Sánchez-Bueno *et al.*, 2006). Results indicate that, as a consequence of this change in the strategic tendency, Spanish firms were able to improve firm profitability. These results support the empirical findings of some studies from different countries (Grant *et al.*, 1988; Tallman and Li, 1996; Geringer *et al.*, 2000) that also find that intermediate levels of diversification predict higher profitability. The main

¹⁸ These studies did not directly test for the linear model. In particular, they tested for the curvilinear effect of diversification on firm performance from samples that included firms with different levels of diversification (low, moderate and high) and all of them found that moderate degrees of diversification often predict higher sales growth.

explanations for our result could be the access to additional profits by exploiting multiple advantages across different businesses, without having to bear the costs of maintaining high levels of diversification (Palich *et al.*, 2000), and the fact that in more recently developed economies, such as the Spanish economy, diversifiers may create more value and be more successful because of the presence of greater market inefficiencies (Chakrabarti *et al.*, 2007). On the other hand, results have also shown that, according to the study by Palich *et al.* (2000), increasing diversification is associated with proportional or linear increases in firm ROA when using a sample that hardly includes firms with high levels of diversification.

Overall, it is possible to conclude that the tendency towards greater diversification shown by large Spanish firms during the last decade seems to have favourably affected firm performance. Indeed, results indicate that the strategic change from low to moderate levels of diversification has been translated into both growth and profitability benefits over recent years; that is, as long as diversification stays within the scope of the resources and capabilities, it will provide increased benefits for firms (Tanriverdi and Venkatraman, 2005). However, contrary to what we expected, results also suggest that the positive impact of this strategy has been stronger on firm growth *-exponential effect-* than firm profitability *-linear effect-*. Spanish firms seem to have emphasized increasing market share over short-term profitability when engaging in the diversification strategies during the period analyzed. As it has already been noted, this could be related to particular economic conditions and institutional effects in Spain.

This study also shows that the Spanish context has changed over recent years in a way that has positively influenced the diversification-performance relationship. Historically Spanish firms have shown a low level of diversification and previous empirical evidence has hardly been able to demonstrate the positive effects of this strategy. During the period studied, the strategic changes from low to moderate levels of diversification have mainly been a defensive reaction to a perceived threat in a highly competitive environment; that is, the outcome of a rational benefits-seeking behaviour for the adaptation and survival in a new business context. For this reason, benefits derived from this strategy by Spanish firms seem to have been greater than costs associated with its implementation, with the consequent improvement in firm performance. The results obtained support the notion that as environmental conditions fluctuate, the level of diversification also seems both to vary and to have varying effects on performance¹⁹ (Geringer *et al.*, 2000; Mayer and Whittington, 2003; Singh *et al.*, 2007; Chakrabarti *et al.*, 2007).

The findings of this study may have implications for research. First of all, our results, combined with the results of previous works for an earlier period (Suárez-González, 1994; Menéndez and Gómez, 2000; Ramírez and Espitia, 2002), suggest that the

¹⁹ As well as the analysis of a different period and business context, other reasons for further explaining the discrepancies in results between this study and previous empirical research in Spain may be the focus on the initial decision to diversify, the employment of different measures of diversification and performance, the use of different sources of data, the application of different methods, or the unequal distribution of the sample by industries.

performance effects of diversification in the Spanish economy varies over time as a consequence of possible strategic changes in response to changing environment. Thus, it is possible to deduce that contextual variations within countries may help explain the pattern of inconsistent results in this research stream. Second, our findings suggest that it may have substantial benefits for research on the diversification-performance link in a particular country from systematic replication studies across different periods characterized by different business contexts.

From a practical perspective, the results of this study constitute a new contribution to the debate regarding the effects of diversification on firm performance. When in international economic and business forums, in the presence of an extremely fierce and competitive environment, it is common to hear about the urgent need for firms to engage in strategies to improve their competitiveness, the findings of this study demonstrate that the change from the low to moderate range of diversification may be an appropriate option for attaining such a goal.

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APPENDIX I

First-stage probit regression predicting propensity to diversify

Variables	Coefficients	S.E.	z-Statistic
Constant	4.35**	1.38	3.15
Corporate control	-0.37	0.27	-1.39
Insiders proportion	0.01**	0.01	2.99
Log of total assets	-0.28***	0.08	-3.56
CAPEX/Sales	-0.12	0.12	-0.97
Export activity	0.40*	0.18	2.20
Industry ROA	-0.02*	0.01	-2.06
Fraction diversified firms	0.07**	0.03	2.54
Number of total observations			236
Number of censored observations			118
Log-likelihood test statistic			-139.46***
Pseudo-R ²			0.15

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 1**Means, standard deviations and pairwise correlations**

Selection equation										
Variables (N = 236)	Mean	S.D.	1	2	3	4	5	6	7	
1.Diversification (dummy)	0.50	0.50	1.00							
2.Corporate control	1.21	0.41	0.04	1.00						
3.Insiders proportion	13.5	26.6	0.22***	0.49***	1.00					
4.Log of total assets	17.04	1.23	-0.24***	-0.08	-0.05	1.00				
5.CAPEX/Sales	0.45	0.70	-0.06	0.11	0.05	0.02	1.00			
6.Export activity	0.57	0.49	0.18**	-0.10	0.17**	-0.02	0.05	1.00		
7.Industry ROA	-1.84	22.85	-0.16**	-0.09	-0.07	0.19**	-0.07	-0.05	1.00	
8.Fraction diversified firms	6.27	3.19	0.15*	0.03	0.01	0.02	-0.11†	0.02	-0.03	

Regression equation										
Variables (N = 118)	Mean	S.D.	1	2	3	4	5	6	7	8
1.Sales Growth	0.68	0.99	1.00							
2.Change in ROA	0.17	1.46	0.05	1.00						
3.Diversification	0.75	0.41	0.33***	0.25**	1.00					
4.Corporate control	1.23	0.42	-0.06	-0.20**	-0.14	1.00				
5.Insiders proportion	19.39	31.28	-0.11	0.45***	0.08	0.35***	1.00			
6.Log of total assets	16.74	1.16	-0.29**	-0.05	-0.13	-0.01	0.04	1.00		
7.CAPEX/Sales	0.41	0.57	-0.05	-0.04	-0.03	0.03	-0.07	0.05	1.00	
8.Export activity	0.67	0.41	0.05	0.34***	0.05	-0.09	0.27**	0.09	-0.01	1.00
9.Industry ROA	-5.60	20.94	0.07	0.02	0.01	-0.11	-0.01	0.06	-0.12	-0.03

†p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 2
Second-stage regression predicting the effect of diversification on firm growth
(Dependent variable: Sales growth)

Variables	Model 1	Model 2	Model 3 ^a
Constant	3.16† (1.88)	1.68 (1.87)	1.94 (1.49)
Corporate control	0.16 (0.27)	0.32 (0.27)	0.14 (0.22)
Insiders proportion	-0.01† (0.01)	-0.01* (0.01)	-0.01* (0.01)
Log of total assets	-0.11 (0.13)	-0.06 (0.13)	-0.08 (0.10)
CAPEX/Sales	0.03 (0.17)	0.04 (0.16)	-0.01 (0.14)
Export activity	0.01 (0.26)	-0.01 (0.26)	0.22 (0.21)
Industry ROA	0.01† (0.01)	0.01† (0.01)	0.01† (0.01)
Diversification (D_i)		0.79*** (0.21)	0.42* (0.19)
Diversification Squared (D_i^2)			1.70*** (0.31)
Inverse Mills Ratio (λ_i)	-0.91 (0.63)	-0.98 (0.61)	-0.48 (0.51)
Wald ^b	χ^2 (12) = 42.70***	χ^2 (13) = 57.10***	χ^2 (14) = 98.19***
R ²	0.117	0.211	0.385
ΔR^2	0.117	0.093	0.174
ΔF	2.090*	12.860***	30.535***

^a The diversification variable (D_i) used in the quadratic term (D_i^2) is centered to avoid multicollinearity problems. Results are similar if uncentered.

^b Wald test is a χ^2 test of all coefficients in the regression model, except the constant, are equal to 0 (Heckman, 1979).

Values are unstandardized coefficients, with standard errors in parentheses

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001

Table 3
Second-stage regression predicting the effect of diversification on firm profitability
(Dependent variable: Change in ROA)

Variables	Model 1	Model 2	Model 3 ^a
Constant	2.29 (2.07)	1.29 (2.10)	1.68 (2.06)
Corporate control	-1.25*** (0.30)	-1.14*** (0.30)	-1.14*** (0.31)
Insiders proportion	0.02*** (0.01)	0.02*** (0.01)	0.02*** (0.01)
Log of total assets	-0.07 (0.14)	-0.04 (0.14)	-0.04 (0.14)
CAPEX/Sales	0.06 (0.20)	0.07 (0.20)	0.07 (0.20)
Export activity	0.45† (0.30)	0.44† (0.29)	0.45† (0.30)
Industry ROA	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Diversification (D_i)		0.52* (0.26)	0.51† (0.28)
Diversification Squared (D_i^2)			0.04 (0.44)
Inverse Mills Ratio (λ_i)	-0.29 (0.72)	-0.34 (0.71)	-0.33 (0.72)
Wald ^a	χ^2 (12) = 70.40***	χ^2 (13) = 75.31***	χ^2 (14) = 75.43***
R ²	0.393	0.412	0.412
ΔR^2	0.393	0.019	0.000
ΔF	10.166***	3.476*	0.015

^a The diversification variable (D_i) used in the quadratic term (D_i^2) is centered to avoid multicollinearity problems. Results are similar if uncentered.

^b Wald test is a χ^2 test of all coefficients in the regression model, except the constant, are equal to 0 (Heckman, 1979).

Values are unstandardized coefficients, with standard errors in parentheses

† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001