SPANISH LISTED FIRMS IN THE LAST PERIOD OF ECONOMIC CRISIS: THE PERFORMANCE OF CORPORATE DIVERSIFICATION

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FUNDACIÓN DE LAS CAJAS DE AHORROS
DOCUMENTO DE TRABAJO
Nº 783/2016

De conformidad con la base quinta de la convocatoria del Programa de Estímulo a la Investigación, este trabajo ha sido sometido a evaluación externa anónima de especialistas cualificados a fin de contrastar su nivel técnico.

ISSN: 1988-8767

Spanish Listed Firms in the last period of economic crisis: The performance of corporate diversification.

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Abstract

Based on an original sample of Spanish listed companies from non-financial sectors during 2006-2011, we show that geographic diversification offers a flexible strategy for companies in a period of economic crisis. We find a U-Shaped geographic diversification-performance relationship and we portray lack of evidence of product diversification premium unless it is combined with high levels of geographic diversification. Results are robust after controlling for the endogeneity of both types of diversification. Our findings highlight the bidirectional influences of both strategies on firm performance and the value of the joint analysis to avoid underestimate the firm level of corporate diversification.

Keywords: Product diversification, Geographic diversification, Firm performance measures, Economic Crisis, Entropy Index.

JEL Classification: L25, F23, L20

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Acknowledgements: Pablo Garrido-Prada gratefully acknowledge support from the Spanish Ministry of Science and Innovation research grant: BES-2010-039627.

1. Introduction

The study of corporate diversification[1] remains important in the business and economic literature as it is a strategy widely used by companies to increase growth and competitiveness. The relationship between product or geographic diversification and performance is a core aspect in this analysis, but literature does not provide clear evidence about whether corporate diversification generates net benefits or costs[2].

The existence of mixed results and theoretical arguments in this field could be linked to the fact that most of the papers analyze the effect of product or geographic diversification on firm performance separately, which might lead to underestimate the firm´s actual level of diversification (Peng and Delios, 2006). Only few studies inspect the interaction effects between both types of diversification on firm performance finding also different results (e.g. Nachum, 2004, Lu and Beamish, 2004, Chen et al., 2014, Chang and Wang, 2007, Geringer et al., 2000). Prior literature argue that product diversification strategy influences the geographic diversification-performance relationship (Chang and Wang, 2007). However, we discuss that in a period of economic crisis, where there are drastic changes in the environment, companies can reorganize easier and quicker their geographic diversification strategy rather than adapt their product diversification strategy itself. For instance, firms can respond rapidly to unanticipated –and anticipated- downward fluctuations in domestic demand by expanding the portfolio of international clients (Shaver, 2011). Therefore we expect that the flexibility obtained by the geographic diversification positively affect the performance (Lee and Mar, 2009) and also positively influences the relationship between product diversification and performance. For that, we consider the level of product and geographic diversification and its interaction, measured by Entropy index, in the same analysis. We delve into the analysis of the interaction examining

[1] We use the term corporate diversification to refer to product and geographic diversification. We consider horizontal non-related business segments as product diversification using NACE2009 rev.2 code categorizes business segments.

[2] For a further literature review see BENITO-OSORIO, D., GUERRAS-MARTÍN, L. Á. & ZUÑIGA-VICENTE, J. Á. 2012. Four decades of research on product diversification: a literature review. *Management Decision,* 50**,** 325-344. and WAN, W. P., HOSKISSON, R. E., SHORT, J. C. & YIU, D. W. 2011. Resource-Based Theory and Corporate Diversification: Accomplishments and Opportunities. *Journal of Management,* 37., for product diversification; and See HITT, M. A., TIHANYI, L., MILLER, T. & CONNELLY, B. 2006. International Diversification: Antecedents, Outcomes, and Moderators. Ibid.32**,** 831-867., for international diversification.

the influences of geographic diversification on the relationship between product diversification and firm performance.

Further, home country environments and time period also affect the corporate diversification-performance relationship (Lee et al., 2008, Wan and Hoskisson, 2003, Peng and Delios, 2006). The level of institutional development may alter the benefits and costs of both types of diversification strategies. Largely, the work done so far has focused on the USA, Japan or UK, although for the last two decades it has been also conducted in emerging countries (e.g. Chen et al., 2014, Li and Yue, 2008). Thus, studies of product or geographic diversification-performance relationship in other economies, including some Europe countries, are less frequent and need to be checked it (Braakmann and Wagner, 2010, Wan and Hoskisson, 2003, Ruigrok and Wagner, 2003, Capar and Kotabe, 2003). To conduct this analysis, we run our own database by collecting raw corporate diversification's data from Spanish independent listed firms to widen the corporate diversification analysis. We contextualize our hypotheses and conclusions to a period of economic crisis, because Spain, the sixth largest economy in Europe, entered in a deep recession in 2008 due to lack of liquidity, rising defaults and debt that caused the bank bailout, 22% unemployment rate in late 2011, and a long and steady GDP constrictions during the period 2008-2011. We also include market and accounting-based performance measures to provide a broader diversification results analysis. Specifically, we use Economic Value Added (EVA) as market performance measure[3], and Earnings before interest and Taxes (EBIT) as accounting-based measure. To our knowledge, EVA has not been used in the corporate diversification-performance analysis.

An additional explanation of the mixed results is the potential endogenous relationship between corporate diversification and firm performance. A large group of authors analyze whether be diversified is a firm's endogenous choice (e.g. Gande et al., 2009, Villalonga, 2004, Campa and Kedia, 2002, Dastidar, 2009), and they find that the negative impact of both types of diversification on firm performance is drastically reduced and even become positive after controlling for the endogeneity issue. Even the level of both types of diversification can be decided by the corporation –e.g. increase diversification, refocus, or do nothing- (Çolak, 2010), thus

[3] EVA is a trademark of Stern Stewart Management Services.

we control the endogeneity of the level of product and geographic diversification in a robustness check analysis.

The paper is structured as follows. Section 2 reviews the theoretical and empirical literature and explains the hypothesis raised in this study. Section 3 describes the data and the sample selection criteria. Section 4 defines the modelling procedure, the estimation method and variables. Results are presented in section 5 and robustness check, which include the potential endogeneity of the degree of both types of diversification, are reported in section 6; finally we finish with the conclusion of this research in Section 7.

2. Literature background and hypotheses.

2.1. Product diversification and performance

The existing literature has identified several key benefits of diversifying. Both Transition Cost Economics (TCE) and Industrial Organization Economic (IO) consider that *operational efficiency* can be improved taking advantage of market inefficiencies (Williamson, 1981). Thus, product diversified companies capture economies of scope by sharing specialized resources or reducing transaction costs shifting capital within the firm to where it is expected to bring the greatest returns (Stein, 1997, Teece, 1982, Teece et al., 1997). The Resource Basic View (RBV) and TCE perspectives also emphasize the benefits of knowledge transfer and innovation between lines of business (Miller et al., 2007). These effects can be easier achieved when business lines are under the same corporation. Companies can thereby reach economies of scope, transferring methods and managerial skill across business lines or managing different resources through the exercise of dynamic capabilities (Teece et al., 1997). There are also powerful financial reasons to diversify, such as lower cost of capital, better allocation, risk reduction and tax advantages through intra-firm transactions (Berger and Ofek, 1995, Schmid and Walter, 2009). In that sense, from the internal market efficiency perspective, diversified firms can allocate their capital resources more efficiently that no diversified firms by optimally using internal capital (Scharfstein and Stein, 2000). These potential benefits can be even higher in a period of economic crisis when external financial markets suffer constraints. Hovakimian (2011) find that in a period of economic crisis, when external financing cost are higher, companies improve the efficiency of internal capital markets by increasing the allocation of funds to high performance segments relative to low

performance segments. Similarly, Kuppuswamy and Villalonga (2010) analyze a sample of US companies during the financial crisis and show that the firm value increased in 2007-2009 because product diversification generated financing and investment advantages. Finally, IO economics advocates that by gathering different segments, the firm can achieve greater market power in relation to suppliers, customers and competitors (Palich et al., 2000).

Nevertheless, a significant group of researchers show a negative effect of product diversification on firm performance (e.g. Lang and Stulz, 1994, Berger and Ofek, 1995, Servaes, 1996, Chatterjee and Singh, 1999, Denis et al., 2002, Tongli et al., 2005, Chakrabarti et al., 2007, Braakmann and Wagner, 2010, Hoechle et al., 2012). Relying on the TCE, increasing product diversity increases the administrative and coordination costs as well (Williamson, 1981). Managers are "boundedly rational" and limited in their cognitive capacities, thus they are not able to absorb all information from their environment (Nachum, 2004, Zahra and George, 2002, Ciabuschi et al., 2011). In a period of economic crisis, managers have to face with unpredictable and uncertain new scenarios hampering the right decisions. A non-optimal corporate decision due to uncertainty can negatively affect all segments, but even an optimal decision taken in a segment may adversely affect another segment of the same corporation. For instance, the bankruptcy of a subsidiary can influence in the solvency and financing of others subsidiaries of the corporation.

Besides, in general principal-agent theory, a diversification strategy may exhibit, what is usually called, agency problems. Thus, the aim of the agent –managers- who seek the survival of the company or their own personal interests, do not coincide with the aim of the principal –shareholders- who seek to maximize firm profitability (Wan et al., 2011, Montgomery, 1994). This trade off may also be particularly relevant in a period of economic crisis where diversified firms can invest inefficiently to keep some of their business lines, spending too little on profitable segments and too much on less profitable segments (Rajan et al., 2000, Scharfstein and Stein, 2000, Denis et al., 2002, Lamont and Polk, 2002). As we said before, a non-optimal corporate decision may negatively affect all segments, but even the required decisions taken in a segment can adversely shake another segment of the same company. Hence, managers have incentives to postpone and limit their decision in order not to harm excessively to a particular segment which may reduce the overall firm performance.

Finally, managers that belong to a business unit have less incentive to deliver high performance because they feel less market pressure under the security provided by the corporation (Williamson, 1981).

The overall costs and benefits of product diversification can explain the wide variety of results and may be different in a period of economic crisis. We hypothesize that expanding product diversity may be negative in a period of crisis, because corporations can prioritize some business lines instead of others, and invest (or disinvest) inefficiently due to short term firms' necessities and uncertainty new environment. Similarly, a necessary decision taken in a segment may be counterproductive to the others segments which may limit the efficiency of the corporation. Furthermore, product diversification strategy is little adaptable to sudden changes in the environment where the transfer of technology, resources or assets between segments is not immediate. Given the above, we propose the following hypothesis: in periods of economic crisis, the costs of increasing product diversity exceed the benefits.

Hypothesis 1. Increasing the degree of product diversification decreases firm performance in a period of economic crisis.

2.2. Geographic diversification and performance

Companies decide to diversify geographically seeking potential competitive advantage (Wang et al., 2012a). Benefits of geographic diversification arise from the possibility to exploit economies of scale and scope by sharing and exploiting home company resources (Tallman et al., 2004, Chakrabarti et al., 2007). Besides, geographic diversification can help reduce the costs of accessing to new inputs (Kotabe et al., 2002), increase the market power of the company (Li and Yue, 2008) and transfer knowledge more efficiently than no geographic diversified firms (Vermeulen and Barkema, 2001, Hitt et al., 1997, Zahra et al., 2000, Vega-Jurado et al., 2008). Thus geographic diversification is a mechanism of risk reduction, spreading the risk of adverse outcome and enhancing the preferential access to opportunities (Rugman and Verbeke, 2004).

However, geographically diversified companies have to deal with different environments – different cultures, labor force conditions, legislation, capital markets or products to suit the different international markets- which may increase administrative and coordination costs (Hennart, 2007). Similarly, the company has to

face with the exporting infrastructure and the supervisory capacity of managers is limited, so in many cases, the task of supervision and decision is complex and difficult to manage in international corporations (Gomes and Ramaswamy, 1999, Contractor et al., 2007, Ciabuschi et al., 2011).

Studies of geographic diversification show mixed results. Scholars have found positive (e.g. Hitt et al., 2006, Gaur and Kumar, 2009, Delios and Beamish, 1999), negative (e.g. Geringer et al., 2000, Denis et al., 2002, Gande et al., 2009), inverted U shaped (e.g. Geringer et al., 2000, Hitt et al., 1997), and U shaped relationships between geographic diversification and performance (e.g. Capar and Kotabe, 2003, Ruigrok and Wagner, 2003, Lu and Beamish, 2004, Contractor et al., 2007, Li and Yue, 2008). These U-Shaped relationship implies that in the first stage or low level of diversification, the costs of technology, knowledge transfer and bureaucratic are high, which may decrease profitability. However, after learning through and establishing appropriate management channels, firms may reduce entry barriers and expand foreign sales and profitability (Lu and Beamish, 2004).

In a context of economic crisis, geographic diversification may offer a flexible strategy for firms. For instance, having an established exporting infrastructure, companies can respond rapidly to unanticipated –and anticipated- downward changes in domestic or international demand, shifting sales to other foreign markets (Shaver, 2011, Lee and Makhija, 2009). Thus, geographic diversification open preferential access to opportunities compared to non-geographic diversified firms. Further, exporting investments are significantly oriented toward enhance relationships with overseas distributors and partners. If conditions in one foreign country become adverse in an economic crisis period, firms can redefine the investment with lower sunk cost associated with the discontinued project than when the investment involves huge amount of fix assets (Lee and Makhija, 2009). In that sense, we hypothesize that increasing geographic diversification may compensate downwards effects in a period of economic crisis, but only if the company have enough exporting knowledge and infrastructure to compete in foreign markets. As we said before, geographic diversification involve some extra investment such as foreign market research, export licenses, distribution and production networks which is costly and time consuming. Companies that have already invested in these processes may have greater opportunities to achieve the benefits of geographical diversification. Thus, we

hypothesize a U-Shape relationship between geographic diversification and performance being the cost higher than benefits in in low level of diversification but in high level, the sum of benefits exceeds the costs:

Hypothesis 2. Geographic diversification has a U-shape relationship with performance in a period of economic crisis.

2.3. The interaction effect between the two types of diversification and performance

Initially, there is no reason to think that the costs and benefits described above for each type of diversification are different when both types of strategies are combined. When the company is involved in both types of diversification, it may reduce monitoring capacity of managers and increase coordination and administrative costs markedly. However, there are also potential benefits. The opportunities to achieve synergies and develop economies of scope and scale are higher. For instance, in a period of economic crisis, managers can mitigate business segments constraints expanding their activities overseas, or can enhance efficiency in resources allocation exploiting multinational network for their different business lines (Shaver, 2011, Lee and Makhija, 2009). The interaction between both strategies increase the firm's options of making an investment profitable, and it is a risk reduction mechanism. Further, managers in highly product diversified firm may learn from their experience of diversification that impact positively in geographic diversification performance outcome (Hitt et al., 1997). Managers learn from past experiences applying more efficient mechanisms to facilitate transactions across markets and facilitating decision making process (Teece et al., 1997, Chang and Wang, 2007).

Empirical studies show again mixed results when interaction is added. Whereas Geringer et al. (2000) and Tallman and Li (1996) do not find significant effects of the interaction on firm performance, Chang and Wang (2007) and Chen et al. (2014) find that while related product diversification positively influences the performance of multinational firms but unrelated product diversification negatively moderates the geographic diversification–performance relationship. Therefore, prior research find that product diversification strategy has effect on the geographic diversification-performance relationship (Chang and Wang, 2007). However, we argue that companies can reorganize quicker and cheaper their geographic diversification strategy rather than their product diversification strategy. Thus, we expect that

geographic diversification also had influences in the product diversification-performance relationship. For instance, companies can exploit the international networks, assets and distribution channels to increase exports of some business lines compensating the domestic demand decreases (Shaver, 2011). Firms can also reallocate idle assets due to the economic crisis in other business lines, other regions or a combination of other business lines and regions. Therefore, companies can minimize the downside effect of reorganizing the business segments of the firm in a period of economic crisis by exploiting synergies of the combination of both types of diversification.

In a period of economic crisis, the interaction between both types of diversification may be more significant. The flexibility achieved by geographic diversification (Lee and Makhija, 2009) can be combined with additional potential benefits provided by product diversification, such as better internal capital market efficiency in a period of economic crisis (Hovakimian, 2011). We therefore expect that a positive combination of product and geographic diversification, may reach greater performance:

Hypothesis 3. The interaction of geographic and product diversification increase firm performance in a period of economic crisis.

3. Data

In this paper we build a novel database with raw corporate diversification data of independent Spanish listed companies[4], not belonging to financial sector. This database allows, first, to collect homogeneous data of the degree of geographic and product diversification based on the International Financial Reporting Standards Operating Segments (IFRS 8). Such information is included in the annual reports of listed companies available in the *Comisión Nacional del Mercado de Valores (CNMV).* Second, to calculate accounting and market performance measures in a broadest sample of Spanish listed firm and not only IBEX35 Spanish companies.

Our data includes 100 companies from 2006 through 2011. We extracted the segment information for each company and year obtaining their consolidated accounting data from their annual reports. The same information was gathered, for each of the firm's product segments, and each reported geographic segment.

[4] We consider that a company or corporation is independent when is not controlled for more than 25% of its capital by another company or business group, i.e. it is autonomous in its decision making.

Following other global databases, each of these product segments has an associated NACE2009 activity code. Additionally, we obtained company shares, market capitalization and Spanish ten-year bond from Bloomberg's database.

Spain provides an appropriate setting to test the effect of product and geographic diversification on firm performance in a period of economic crisis. Figure 1 presents quarterly gross domestic product (GDP) growth in Spain. The period of economic crisis began in 2008 moving from a growth in the first quarter of that year of 1.02% to a decline of 1.73% in the first quarter of next year. Although the economy remained constants (0.2%) in 2010 started to decline again in 2011.

Insert Figure 1

Table 1 presents descriptive statistics about the size and degree of diversification of the firms. The database consists of large companies[5]: the mean assets per company is 6,922.23 million Euros in 2011 and the mean net turnover per company is 3,324.78 million Euros in the same year. Indeed, the sum of the net turnover of all them accounts for 31.14% of the Spanish GDP in 2011, and its assets are equivalent to 64.83% of GDP in that year[6]. Yet, the difference in size is notable, the interquartile range in 2011 for assets 3251.37 million Euros and 1672.91 million Euros for net turnover.

We reach a wide variety of sector representing in the database: most companies belong to the manufacturing sector (42 companies) followed by the construction sector (22), energy and supplies (7) and information and communications (7). With regard the types of diversification, 97% of the companies in our sample used product or geographic diversification as a strategy. In 2008, the beginning of the period of economic crisis, 36% (37%) firms increased (decreased) the degree of product diversification and 55% (30%) companies increased (decreased) the geographic

[5] A great number of studies were performed with samples of large and generally listed corporations such as CHEN, Y., JIANG, Y., WANG, C. & HSU, W. C. 2014. How do resources and diversification strategy explain the performance consequences of internationalization? *Management Decision,* 52**,** 897-915., GAUR, A. S. & KUMAR, V. 2009. International Diversification, Business Group Affiliation and Firm Performance: Empirical Evidence from India. *British Journal of Management,* 20**,** 172-186., GRAHAM, J. R., LEMMON, M. L. & WOLF, J. G. 2002. Does Corporate Diversification Destroy Value? *The Journal of Finance,* 57**,** 695-720. or WANG, C.-F., CHEN, L.-Y. & CHANG, S.-C. 2011. International diversification and the market value of new product introduction. *Journal of International Management,* 17**,** 333-347..

diversification compared to 2006. In this sense, 41% (34%) expanded (decreased) the degree of product diversification and 48% (38%) companies increased (decreased) the geographic diversification during the period 2008-2011. Finally, there were 9 companies which did no diversified in any type of diversification in 2006 while there were only 3 companies in 2011.

Insert Table 1

Figure 2 shows the overall total sales and domestic sales for the companies of the sample. While domestic demand decrease since the beginning of the economic crisis in 2008, total sales growths every year except in 2009. This graph implies that companies have adapted to the decline in domestic demand through increasing their overseas sales. Whereas in 2008 companies exported 49.84% of their product and services in 2011 it intensified to 59.60% of the total sales.

Insert Figure 2

4. Econometric modelling and variables

We proposed the following model to examine the hypothesis regarding the relationship between product, geographic diversification and performance:

$$P_{it} = \boldsymbol{X_{it}}\beta + \alpha_k * D_{it} + \mu_{it} \quad [1]$$

P_{it} is the performance for firm *i* and year *t*, $\boldsymbol{X_{it}}$ is the matrix with the constant and control variables that may affect performance, D_{it} is the diversification specification and μ_{it} is the disturbance term where $\mu_{it} = u_i + e_{it}$ being u_i the individual effects and e_{it} the idiosyncratic error term. In the equation [1] the individual effects is modeled as fixed to include unobserved firm characteristics in the models, and to control for heterogeneity between firms. We assumed that firms have different resources or capabilities which may have effects on performance, such as R&D intensity (Kotabe et al., 2002) or absorptive capacity (Wang et al., 2012b). They also belong to different sectors that may affect the performance and the degree of diversification (Wang et al., 2012a). We tested for this assumption using the

[6] Source for the Spanish GDP: AMECO.

Hausman test[7] rejecting random-effects. Each model provides corrections for the presence of autocorrelation and heteroscedasticity. Table 2 summarize 5 different diversification specifications to check our 3 hypothesis.

Insert Table 2

The dependent, exploratory and control variables were measured as natural logarithms to obtain elasticities from their coefficient, and diversification variables in model 2, 4 and 5 were centered to easier interpretation[8].

Dependent variables. We used Economic Value Added[9] to total assets (EVA/Assets) and Earnings Before Interest and Taxes to total assets (EBIT/Assets) as market and accounting performance measure respectively (see the Appendix for more details)[10]. We include both measures as a guarantee of a wider analysis of the firm performance.

Explanatory variables. The degree of product and geographic diversification was measured by the sale-based Entropy index[11]. This measure highlights the sales

[7] A test of fixed versus random effects can be seen as a test of over-identifying restrictions. We use xtoverid STATA command developed by Schaffer and Stillman, (2011). This test is highly appropriate for heteroscedastic- and cluster-robust standard errors models like our model. The random effects estimator uses the additional orthogonality conditions that the regressors are uncorrelated with the group-specific error, while the fixed effects estimator only uses the orthogonality conditions that the regressors are uncorrelated with the idiosyncratic error. These additional orthogonality conditions in random effects are over-identifying restrictions. This command calculates the artificial regression approach described by Arellano (1993) and Wooldridge (2002, pp. 290-91), in which a random effects equation is reestimated augmented with additional variables consisting of the original regressors transformed into deviations-from-mean form. The null hypothesis, of either the Hausman form of the test or of the test performed by xtoverid, is that RE is consistent.

[8] Mathematically:

$$lnY_{it} = \alpha_i + \beta_1 lnIEp_{it} + \beta_2 lnIEg_{it} + \beta_3(lnIEp_{it} - \overline{lnIEp})^2 + \beta_4(lnIEg_{it} - \overline{lnIEg})^2 + \beta_5\left(lnIEp_{it} - \overline{lnIEp}\right)\left(lnIEg_{it} - \overline{lnIEg}\right) + controls + \varepsilon_{it}$$

being: lnY_{it} the logarithm of EVA / Assets or EBIT / Assets; α_i are firms fixed-effects added the constant; $lnIEp_{it}$ the logarithm of Product entropy index; $lnIEg_{it}$ the logarithm of Geographic entropy index; $\overline{lnIEp}$ the overall mean of the logarithm of Product entropy index; and $\overline{lnIEg}$ the overall mean of the logarithm of Geographic entropy index.

[9] EVA is a trademark of Stern Stewart Management Services.

[10] We also used other common accounting-based performance measures which are not directly affected by stock market fluctuations – EBIT and EBITDA to sales, EBITDA to assets and return on assets (ROA)-. For space reasons, we only report estimations with EVA/Assets and EBIT/Assets. Results are available upon request. Finally, we cannot use Excess value measures for product diversification, because 93% of firms are diversified in our sample and we do not have information about undiversified firms in each sector.

[11] We use Jecquemin and Berry (1979) Entropy measure definition. We also use Herfindahl Index as product and geographic diversification measure, the results remain similar.

distribution of the segments thus it is a valuable diversification indicator, giving information if the company is diversified as well as the degree and time evolution of firm diversification. We measured the product Entropy index using two-digit NACE-2009 codes. The degree of internationalization was calculated assuming 7 different regions – Spain, Europe, Latin America, USA and Canada, Africa, Asia and Pacific, and a non-specified region. Non-specified region included sales reported by the firm which cannot be attributed to any of the six regions described previously. Entropy index is consistent with the majority of previous studies, such as those by Colpan and Hikino (2005), Chang and Wang (2007), Hitt et al. (1997), or Park and Jang (2012).

Control variables. We included accounting as well as corporate governance measures that can affect the performance of the firm. Hoechle et al. (2012) find that part of the product diversification effect on firm performance can be partly attributed to the quality of corporate governance. Thus, we included variables of the structure of corporate governance that have enough variability within firms in the period of analysis. These variables were gathered from the Annual Corporate Governance Reports of the firms and the CNMV. In sum, we controlled for size, liquidity, long term debts, intangible assets, executive directors in the board, directors who serve on multiple boards and significant shareholders non-directors of the board. Lastly, we also added a dummy variable to control for the period of economic crisis started in 2008. Size was measured by total sales to test the significance of scale economies and market power (Gomes and Ramaswamy, 1999, Li and Yue, 2008). Liquidity and debts, two variables highly affected in this period of economic crisis, was measured by the current ratio defined as current assets to current liabilities; and by long-term debt to total assets respectively. In the case of intangible asset, it was measured by the amount of intangible assets to total assets and we try to control for the assets structure of the firm. The percentage of executive directors in the board, and the percentage of non-director significant shareholders[12] try to measure tradeoff of serving shareholders and manager's objectives. The percentage of directors who serve on multiple boards –more than one- is a potential measure of busy board and it may be an indicative of the structure of corporate governance (Fich and Shivdasani, 2006).

5. Results

We begin analyzing the effect of product and geographic diversification as exogenous variables on firm performance. Then, we address for the potential endogeneity of the level of both types of diversification in the robustness check analysis.

Table 4 reports the regression output[13]. Model 1 and 2 analyze product diversification and product diversification square respectively over EVA/Assets and EBIT/Assets as the performance dependent variable. We obtain that increasing the degree of product diversification has a negative but not significant effect on performance (e.g. the coefficient is -0.0838 in model 1 for EVA/Assets). We do not observe nonlinear effects for product diversification: the squared terms are not significant in the model 2 (0.0798 for EVA/Assets and for 0.0870 EBIT/Assets). The results indicate no relationship between product diversification and performance in the period analyzed thus we cannot support our hypothesis 1. These results are in line with previous studies conducted in other regions and periods (e.g. Graham et al., 2002, Mansi and Reeb, 2002, Çolak, 2010).

Model 3 and 4 includes the geographic diversification effect on performance. The coefficient is positive and significant in model 4 in the square parameter (0.297 to EVA/Assets and 0.210 to EBIT/Assets). The positive value on the square parameter, and the non-significance on the linear terms of geographic diversification –model 3- suggests a U-Shape relationship. Thus, as in other previous studies, such us Capar and Kotabe (2003) or Ruigrok and Wagner (2003) for European firms, we find a U-Shape relationship between performance and the degree of geographic diversification which corroborates hypothesis 2. The low level of geographic diversification may be linked with an early stage of overseas activities, in which performance is reduced owing to market unfamiliarity, and not enough market power. Nevertheless, in medium level of geographic diversification, the know-how, the market power yield the companies exploit economies of scope and scale and rises

[12] Non-director significant shareholders is defined as the percentage of significant shareholdings, excluding directors, amounting directly or indirectly to three percent or more of share capital.
[13] Correlation matrix is available in appendix 2.

firm performance. We suggest that when the company has sufficient presence in foreign markets, the overall cost of managing extensive global operations, such as coordination, information overload and monitoring problems, are compensated for the potential benefits of diversifying geographically.

Insert table 3 and 4

Furthermore, the interaction coefficient between both types of diversification and performance is positive and significant in model 5 for EVA/Assets (0.206) as well as for EBIT/Assets (0.336). This result implies that increasing product and geographic diversification at the same time, may increase firm performance. As we discussed previously, in a period of economic crisis, companies can compensate for the low domestic demand by expanding their sales into foreign markets of any of their business lines avoiding restructuring costs of the company size. Thus, we find support for hypothesis 3 that the interaction between both types of diversification exhibits a positive relation with firm performance.

We deepen into the interaction analyzing the marginal effect of changings in the two interacted variables.

We examine the marginal effects of product diversification on firm performance according to different levels of geographical diversification -the other variable that is interacting-. The figure 3 depicting the effect of product diversification on the firm performance in low, medium and high levels of geographic diversification based on model 5.

Insert figure 3

The effect of product diversification, at any level, on firm performance is negative for low levels of geographic diversification, but in average level of geographic diversification, increases in the degree of product diversification remains the firm performance constant. On the contrary, high levels of geographic diversification positively moderate the product diversification-performance relationship. This result suggests that geographic diversification enhances the benefits of product diversification and reduce the costs. In model 1 and 2, we find that the product diversification-performance relationship is not significant, however, this relationship depends on the level of geographic diversification. These results suggest a clear relationship between both types of diversification, where geographic diversification

moderates the effect of product diversification on firm performance, turning it from negative into positive.

Finally, we find significant differences in the marginal effects analyzing the performance measured by EVA/Assets or EBIT/Assets. When we measure performance through EVA/Assets, we find a positive effect of the interaction, but the significance is lower. Figure 4 shows the marginal effect plot of product diversification over performance -measured by EVA/Assets-. The figure confirms that the moderating effect of geographic diversification on product diversification-performance relationship is not as enlightening as in the case of EBIT/Assets - predictions show much dispersion and are not significant to 95%-. One explanation of these differences is that corporate diversification decisions are made generally based on profitability from financial statements, which is measured more accurately by accounting performance measures (Kim et al., 2015).

Insert fig. 4

As for control variables, we find that the performance is positively related to company size, which contrasts the potential advantages of market power. Besides, the liquidity ratio measure through the current ratio is also positive related with performance (e.g. 0.0838 in model 5 for EBIT/Assets). In contrast, long term debts ratio, and the proportions of intangible assets, are not related with performance. Thus, companies get extra benefit using the internal liquidity as a resource in a period of economic crisis. Moreover, the proportion of significant shareholders no members of the board is an appropriate control mechanism of the profitability due to they improve the firm performance (e.g. 0.0595 in model 5 for EBIT/Assets). Further, the proportion of executives in the board is positive for EBIT/Assets (0.176), but not significant for EVA/Asset (-0.0891). This results portray the positive influence of the management structure in the board in the internal financial statements.. Finally, the proportion of directors who serve on multiple boards –usually called busy directors- decrease firm performance using EVA/Asset (-0.241 in model 5), but it is not significant for EBIT/Assets. The negative effect reflects the potential agency problems (busyness effect) of directors in multiple boards[14]. Finally, the period of economic crisis

[14] See FICH, E. M. & SHIVDASANI, A. 2006. Are Busy Boards Effective Monitors? *The Journal of Finance,* 61**,** 689-724., who address the intuition behind the negative effect of "busy board" and its potential endogeneity.

decreases firm performance (e.g. -0.0672 in EVA/Assets and -0.0231 in EBIT/Assets in model 5).

6. Robustness check

To further understand, and to validate, the previous results, we conducted two additional analyzes. In the first place, we considered the potential endogeneity of the degree of both types of diversification. Then, we deepened into the relationship between geographic and product diversification by including others possible interactions between both types of diversification.

A large group of authors analyze whether be diversified is a firm's endogenous choice (Gande et al., 2009, Villalonga, 2004, Campa and Kedia, 2002), but even the level of diversification can be decided by the corporation –e.g. increase diversification, refocus, or do nothing- (Çolak, 2010). Most of the firm of this sample chose to diversify in the late 90s, thus we check the endogeneity of the degree of both types of diversification instead. We estimate model 1 to model 5 applying instrumental variables fixed effect (IV-FE) estimator with the objective to validate the previous results. We included three additional instruments correlated with diversification variables but not with the error of the main regression: the lag of the diversification variable, the lag of the ratio of long term debts and the lag of the current ratio. The previous diversification level is a good indicator of the main sector average diversification and the diversification strategy taken in the long term by the company. Corporations may also make their choices depending on the previous liquidity and debt structure, two relevant variables in a period of economic crisis. In each of the models, Kleibergen-Paap LM rk test reveals that the instruments chosen are correlated with the endogenous regressor, and the null hypothesis of under identification is rejected. Similarly, the Hansen J-Statistics over-identified test reveals that the instruments are exogenous (or not over-identified) for all the models. For models 2,4 and 5 which include the diversification variables squared, we added the squared fitted values of the diversification as instruments following Wooldridge (2010).

Table 5 reports model 1 to model 5 with IV-FE technique. We do not find significant coefficients for product diversification in model 1 and 2 showing no relationship between product diversification and performance as in the previous model 1 and 2

estimated considering the degree of both types of diversification exogenously (FE). Geographic diversification yields a positive coefficient but not significant in model 3 (0.108 in EVA/Assets and 0.101 in EBIT/Assets) and a positive and significant for geographic diversification square in model 4 (0.903 in EVA/Assets and 0.672 in EBIT/Assets). These coefficients are higher than the estimation by FE (0.297 to EVA/Assets and 0.210 to EBIT/Assets) but they are significant using both estimation method.

The interaction is also significant for EBIT/Assets (0.373) but not for EVA/Assets (0.492) which contrast with the significant term obtained by FE for EVA/Assets (0.206). In any case the main two relationship find considering corporate diversification exogenous -the U-Shaped relationship between geographic diversification and performance and the positive effect of the interaction- remain using FE-IV estimation but with higher values.

(Insert table 5 here)

Now, we delve into the effect of the interaction between both types of diversification on performance. Specifically, we check the potential interaction using the square of each type of diversification. Table 6 reports three additional models with the same two dependent variables –EVA and EBIT over assets-. Model 6 introduces the interaction the product diversification squared and geographic diversification. In model 7 interacts product diversification and the square of geographic diversification, whereas in Model 8 presents the interaction between product and geographic diversification with quadratic terms of both variables. None of the interaction coefficients are significant. Thus, although quadratic geographic diversification yields a significant positive coefficient –in models 4-, it does not affect the relationship between product diversification and performance.

7. Conclusions

This paper analyze the corporate diversification-performance relationship examining the interaction effect of product and geographic diversification on firm performance. For this purpose, we built a novel database, and we obtained segmentation data directly from the annual reports of independent Spanish listed companies during the period 2006-2011.

We argue that geographic diversification strategy is a flexible strategy in a period of economic crisis, where there are drastic changes in the environment, such as liquidity and investments constraints, difficulties collects funds or domestic demand decline (Lee and Markinya, 2009). Geographic diversification investments are significantly oriented toward develop relationships with overseas distributors and partners. Thus, firms can redefine the investment with lower cost associated with the discontinued project than when the investment involves huge amount of fix assets as in product diversification strategy. Therefore geographic diversification enhances firm performance but also influences positively the product-diversification performance relationship.

Results reveal that most of the firms has increased geographic diversification in the period 2006-2011, whereas about half of the companies has increased product diversification. We find that the interaction between product and geographic diversification enhances firm performance. Yet the relationship of both types of diversification on performance is complex. Particularly, the findings indicate a discount of product diversification on firm performance in low levels of geographic diversification which change into a premium in high levels of geographic diversification. Thus, companies can compensate for overproduction, and domestic demand decline, of same of their firm's business lines by shifting their product and services into foreign markets, or reallocating assets into other regions and segments. We find support of the beneficial effect of geographic diversification on the product-diversification performance relationship.

Similarly than other previous studies conducted in Europe countries (e.g. Capar and Kotabe, 2003, Ruigrok and Wagner, 2003), we also obtain U-Shaped relationship between geographic diversification and firm performance. We consider that in a period of economic crisis, the overall cost of managing extensive global operations, such as coordination, information overload and monitoring problems, are compensated for the potential benefits of diversifying geographically, but only if the company has enough structure and knowledge to compete overseas –the rising side of the U-Shaped-.

Two main implications arise from this research: First, results highlight the importance of a joint analysis of both types of diversification to understand and avoid

underestimate the firm´s actual level of corporate diversification. We find that the combination of both strategies determine their effects on firm performance. Thus, whereas we do not find a product diversification premium when we only consider this type of strategy in the model - similarly than other previous studies such as (Graham et al. (2002), Mansi and Reeb, 2002, Çolak, 2010); the overall product and geographic diversification effect on firm performance will be depend on the whole corporate diversification strategy pursued by the firms. Second, geographic diversification strategy has influences on the performance of product diversified firm in a period of economic crisis. The flexibility achieved by geographic diversification positively moderates the product diversification-performance relationship. Thus, there is a bidirectional moderating effects of both strategies on firm performance, especially in drastic changes in the environment, where managers cannot easily readapt their product diversification strategies to this new scenario.

To further test the robustness of our findings, we conducted some supplementary analyses. We addressed the potential endogeneity of the degree of both types of diversification, results are similar, but the degree of geographic diversification exhibits a positive exponential relationship with performance. These results indicate that the negative effect of low level of geographic diversification on performance is slightly flattened in a period of economic crisis. Finally, we also used market and accounting-based performance measures to extend the evidence, and we find that corporate diversification strategies have more significant effect on firm performance using accounting performance measures. One explanation is that corporate diversification decisions are made generally based on profitability from financial statements based on accounting performance measures (Kim et al., 2015).

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APPENDIX 1

EVA is a firm's aggregate value measure that describes performance as firm value growth. EVA is an indicator that subtracts from the operating profit of the company the financial cost of capital employed in financing the company. Specifically, we defined EVA on assets ($EVAsAT_{it}$) by company *i* and year *t* to obtain a dimensionless measure of the value generated by active unit:

$$EVAsAT_{it} = \frac{NOPAT_{it} - [(Liabilities + Equity)_{it} * WACC_{it}]}{TA_{it}}$$

NOPAT being the net operating profit after taxes and WACC the weighted average cost of capital. NOPAT was calculated as net profit plus financial expenses:

$$NOPAT = Net\ profit + financial\ expenses$$

We calculated WACC as the rate that a company is expected to pay on average to all its security holders to finance its assets. Mathematically it is the sum of two parts expressed as a percentage: cost of debt (Kd) and cost of equity (RE), both weighted by their relative size in the sum of liabilities and equity[15] of the company.

$$WACC = \left[\frac{Liabilities}{Liabilities + Equity} * Kd\right] + \left[\frac{Equity}{Liabilities + Equity} * RE\right]$$

The cost of debt (Kd) is the amount of interest expenses divided by total debt reported by the company. The return expected by the shareholder or cost of equity (RE) was calculated using an approximation of the Capital Asset Pricing Model (CAPM model). Specifically, we calculated:

$$R_{it} = \bar{R}_{ft} + \beta_{iM}(\bar{R}_{Mt} - \bar{R}_{ft})$$

Where R_{it} is the cost of equity of Company i in year t; $\bar{R}_{ft}$ is the expected risk-free return in the stock-market measured by the mean of daily 10 year Spanish government bond yield for year; $\bar{R}_{Mt}$ is the average annual return of the stock market; and β_{iM} is the sensitivity of the profitability of the company *i* to market

[15] The capital contributed by shareholders is approximated by company's equity.

fluctuations. It can be interpreted as the risk associated with the company shares in relation to the Spanish stock market. β_{iM} was calculated using OLS regress as follow:

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}(R_{Mt} - R_{ft}) + \varepsilon_{it}$$

Where $(R_{Mt} - R_{ft})$ is the daily stock-market premium and $R_{it} - R_{ft}$ is the daily company share premium. Performance of the daily stock market has been calculated as the weighted arithmetic mean of the returns of each company traded that day. To calculate the average annual return of the stock market, we calculated the arithmetic mean of the daily returns of the company.

APPENDIX 2

Table 3 presents the correlation matrix for the variables involved in the models as exogenous. The correlation of the ratio of long term debts and the members of the board in others boards are 0.40 and 0.46 respectively with the size of the firms. We conducted separate analysis with only one of these three at a time. The sign and value of our key explanatory variables remain similar although the significance is higher. To be in the safe side, we decided to retain these variables because all of them have economic sense as control.

Table 3. Descriptive statistics and correlations

	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Sales (size)	6.361	1.772	1								
2. Long debt ratio	0.245	0.136	0.40	1							
3. Current ratio	0.814	0.267	-0.26	-0.21	1						
4. Dummy crisis	0.515	0.5	0.00	0.1	-0.01	1					
5. Intangible assets ratio	0.112	0.128	0.16	0.23	-0.28	0.12	1				
6. Non-director significant shareholders	0.236	0.17	0.18	0.06	-0.08	0.01	-0.01	1			
7. Executive directors	0.175	0.107	-0.23	-0.14	0.22	-0.09	-0.05	-0.2	1		
8. Members of the board in other boards	0.189	0.144	0.46	0.09	-0.08	-0.03	0.05	0.04	-0.19	1	
9. Product diversification	0.322	0.284	0.17	0.16	-0.08	0.04	0.00	0.15	-0.07	0.13	1
10. Geographic div.	0.48	0.28	0.47	0.16	0.06	0.10	0.12	0.00	-0.08	0.23	0.11

N=545 observations. Logarithmic transformation of all continuous variables.

Figure 1. Spanish quarterly GDP Growth 2006-2011

Source: AMECO

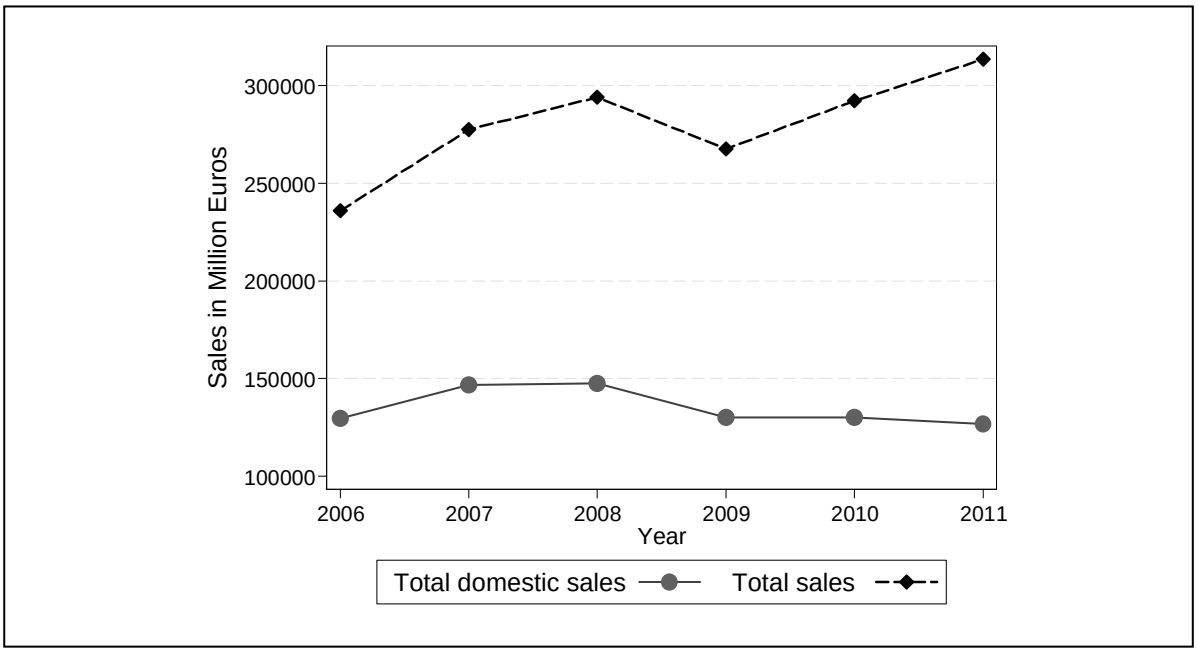
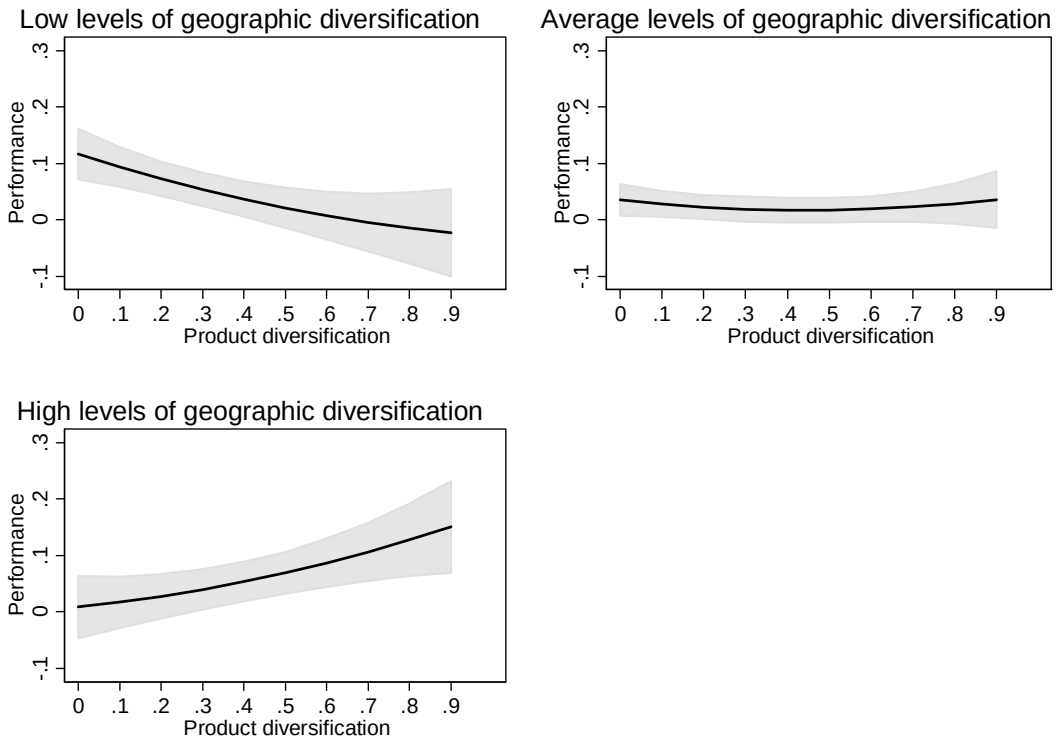


Figure 2. Overall domestic sales and total sales of the companies in the sample

N=91 Companies that reported domestic sales for every year.

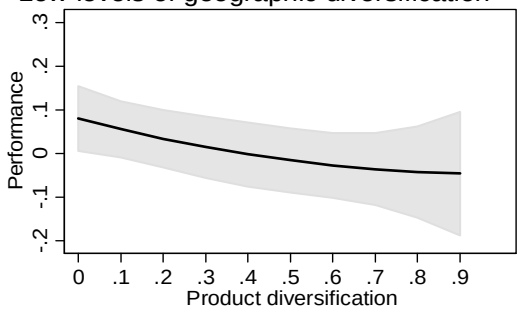
Figure 3. Moderating effect of geographic diversification on the relationship between



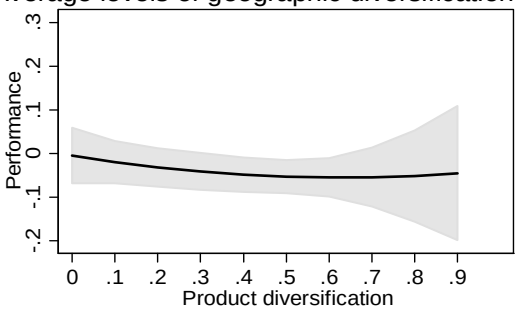
product diversification and firm performance (EBIT/Assets).

Figure 4. Moderating effect of geographic diversification on the relationship between product diversification and firm performance (EVA/Assets).

Low levels of geographic diversification



Average levels of geographic diversification



High levels of geographic diversification

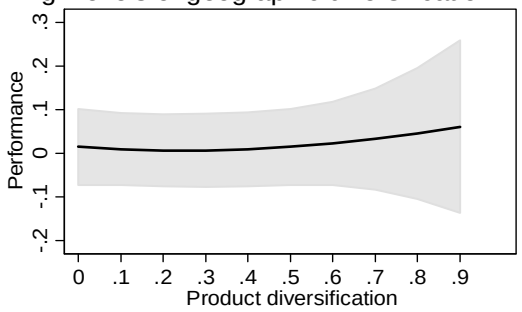


Table 1. Descriptive Statistics

	Year		
	2006	2008	2011
Assets mean (million euros)	5221.11	6235.36	6922.23
Assets median (million euros)	913.31	933.02	971.45
Assets interquartile range (million euros)	3417.95	3314.19	3251.37
Sales mean (million euros)	2530.94	3101.17	3324.78
Sales median (million euros)	509.55	664.21	585.42
Sales interquartile range (million euros)	1117.28	1330.03	1672.91
Product diversification			
Average number of segments (2dig NACE2009)	3.15	3.08	3.04
Median number of segments (2dig NACE2009)	3	3	3
No diversified firms	31	29	25
Refocus firms		37	34
Firms increase diversification		36	41
No diversified firms in any year			22
Geographic diversification			
No diversified firms	24	15	12
Refocus firms		30	38
Firms increase diversification		55	48
No diversified firms in any year			11
Ratio of foreign sales in percentage*	45.09	49.84	59.60
Without any type of diversification			
No corporate diversified firms	9	4	3
No corporate diversified firms in any year			3
Product but not geographic diversified firms	15	11	9
Geographic but not product diversified firms	22	25	22

N=100; *: 91 Companies that reported domestic sales for every year (2006-2011)

Table 2. Models specification

Model	$\alpha_k * D_{kit}$ is equal to	Definition	Testing
1	$\alpha_1 PD_{it}$	Product diversification.	Linear and non-lineal product diversification. (Hypothesis 1)
2	$\alpha_1 PD_{it} + \alpha_2 {PD_{it}}^2$	Product diversification + squared of product diversification.	
3	$\alpha_3 GP_{it}$	Geographic diversification.	Linear and non-linear geographic diversification. (Hypothesis 2)
4	$\alpha_3 GD_{it} + \alpha_4 {GD_{it}}^2$	Geographic diversification + squared of geographic diversification.	
5	$\alpha_1 PD_{it} + \alpha_2 {PD_{it}}^2 + \alpha_3 GD_{it} + \alpha_4 {GD_{it}}^2 + \alpha_5 (PD_{it} * GD_{it})$	Product div. + geographic div. + product div. squared + geographic div. square + Interaction between product and geographic diversification.	Interaction effects (Hypothesis 3)

Table 4. Regression of firm performance on the degree of both types of diversification and their interaction.

	EVA/Assets					EBIT/Assets				
VARIABLES	Model 1 FE	Model 2 FE	Model 3 FE	Model 4 FE	Model 5 FE	Model 1 FE	Model 2 FE	Model 3 FE	Model 4 FE	Model 5 FE
Sales (size)	0.0707***	0.0711***	0.0673**	0.0692***	0.0748***	0.0320**	0.0323**	0.0326**	0.0346***	0.0361***
	(0.0252)	(0.0253)	(0.0263)	(0.0257)	(0.0247)	(0.0126)	(0.0127)	(0.0127)	(0.0125)	(0.0123)
Long debt ratio	0.0326	0.0292	0.0238	0.0350	0.0322	-0.0774	-0.0801	-0.0725	-0.0630	-0.0649
	(0.0783)	(0.0792)	(0.0809)	(0.0800)	(0.0780)	(0.0564)	(0.0569)	(0.0555)	(0.0549)	(0.0554)
Current ratio	0.0712**	0.0724**	0.0734**	0.0620*	0.0645**	0.0908***	0.0917***	0.0881***	0.0797***	0.0838***
	(0.0325)	(0.0318)	(0.0325)	(0.0315)	(0.0299)	(0.0208)	(0.0204)	(0.0216)	(0.0218)	(0.0206)
Dummy crisis	-0.0307***	-0.0305***	-0.0325***	-0.0350***	-0.0318***	-0.0253***	-0.0251***	-0.0252***	-0.0268***	-0.0235***
	(0.00970)	(0.00952)	(0.00961)	(0.00978)	(0.00975)	(0.00565)	(0.00560)	(0.00629)	(0.00640)	(0.00584)
Intangible assets ratio	0.0217	0.0196	0.0347	0.0335	0.0251	0.0447	0.0418	0.0480	0.0447	0.0377
	(0.0690)	(0.0675)	(0.0729)	(0.0710)	(0.0675)	(0.0407)	(0.0403)	(0.0442)	(0.0440)	(0.0442)
% Non-director significant shareholders	0.151*	0.151*	0.154*	0.144*	0.137*	0.0643**	0.0644**	0.0666***	0.0609**	0.0595**
	(0.0797)	(0.0798)	(0.0806)	(0.0787)	(0.0790)	(0.0245)	(0.0251)	(0.0246)	(0.0238)	(0.0248)
% Executive directors	-0.0771	-0.0775	-0.0790	-0.0825	-0.0891	0.172**	0.172**	0.177**	0.173**	0.176**
	(0.125)	(0.126)	(0.125)	(0.120)	(0.123)	(0.0801)	(0.0808)	(0.0805)	(0.0778)	(0.0781)
% Members of the board in other boards	-0.165**	-0.165**	-0.162**	-0.156**	-0.159**	-0.0514	-0.0514	-0.0511	-0.0481	-0.0520
	(0.0726)	(0.0712)	(0.0702)	(0.0717)	(0.0713)	(0.0345)	(0.0342)	(0.0333)	(0.0335)	(0.0324)
Product diversification	-0.0838	-0.0887			-0.0794	-0.0497	-0.0538			-0.0242
	(0.0820)	(0.0792)			(0.0816)	(0.0389)	(0.0384)			(0.0370)
Pro. diversification square		0.0798			0.129		0.0870			0.0920
		(0.252)			(0.248)		(0.0860)			(0.0855)
Geographic diversification			-0.0255	0.00775	-0.00670			-0.0252	0.00226	-0.0111
			(0.0438)	(0.0499)	(0.0483)			(0.0313)	(0.0324)	(0.0276)
Geo. diversification square				0.297*	0.242				0.210**	0.128
				(0.150)	(0.151)				(0.0900)	(0.0817)
Pro. X Geo. Div.					0.206*					0.336***
					(0.116)					(0.0825)
Observations	497	497	495	495	494	545	545	543	543	542
R-squared	0.130	0.131	0.130	0.140	0.146	0.227	0.228	0.222	0.236	0.280
Number of firms	90	90	90	90	90	98	98	98	98	98

Logarithmic transformation of all continuous variables. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1, $^{+}$ p =0.1.

Table 5. First robustness check: Regression of firm performance on the degree of both types of diversification and their interaction (IV-FE)

	EVA/Assets					EBIT/Assets				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
VARIABLES	FE_IV	FE_IV	FE_IV	FE_IV	FE_IV	FE_IV	FE_IV	FE_IV	FE_IV	FE_IV
Sales	0.0337*	0.0346	0.0371*	0.0409**	0.0400*	0.0348***	0.0345***	0.0314***	0.0347***	0.0316**
	(0.0201)	(0.0215)	(0.0197)	(0.0205)	(0.0207)	(0.0115)	(0.0116)	(0.0118)	(0.0123)	(0.0130)
Long debt ratio	-0.0367	-0.0758	-0.0284	0.0145	-0.0432	-0.0808	-0.0750	-0.0782	-0.0501	-0.0753
	(0.0733)	(0.0874)	(0.0732)	(0.0760)	(0.0767)	(0.0532)	(0.0555)	(0.0521)	(0.0538)	(0.0549)
Current ratio	0.0887***	0.103**	0.0806**	0.0501	0.0797**	0.0913***	0.0895***	0.0853***	0.0629***	0.0860***
	(0.0328)	(0.0412)	(0.0335)	(0.0363)	(0.0372)	(0.0194)	(0.0192)	(0.0219)	(0.0226)	(0.0217)
Dummy crisis	-0.0561***	-0.0566***	-0.0631***	-0.0696***	-0.0672***	-0.0181***	-0.0181***	-0.0266***	-0.0304***	-0.0231***
	(0.00935)	(0.00972)	(0.0114)	(0.0123)	(0.0145)	(0.00463)	(0.00470)	(0.00644)	(0.00679)	(0.00728)
Intangible assets ratio	0.0443	0.0117	0.0877	0.0940	0.0379	0.0417	0.0481	0.0670	0.0707	0.0553
	(0.0652)	(0.0747)	(0.0677)	(0.0652)	(0.0677)	(0.0432)	(0.0479)	(0.0440)	(0.0430)	(0.0462)
% Non-director significant shareholders	0.118	0.0899	0.115	0.0857	0.0871	0.0751**	0.0798**	0.0759**	0.0597*	0.0962**
	(0.0874)	(0.0980)	(0.0872)	(0.0858)	(0.0933)	(0.0372)	(0.0396)	(0.0381)	(0.0354)	(0.0392)
% Executive directors	0.0120	0.0694	0.00116	-0.00678	0.0285	0.197**	0.186*	0.212**	0.200**	0.167*
	(0.158)	(0.188)	(0.145)	(0.134)	(0.171)	(0.0951)	(0.0960)	(0.0974)	(0.0892)	(0.0999)
% Members of the board in other boards	-0.263***	-0.262***	-0.247***	-0.231***	-0.241***	-0.0486	-0.0492	-0.0308	-0.0188	-0.0410
	(0.0661)	(0.0672)	(0.0677)	(0.0716)	(0.0706)	(0.0336)	(0.0348)	(0.0336)	(0.0353)	(0.0384)
Product diversification	0.0569	0.0914			0.0610	-0.0574	-0.0626			-0.0303
	(0.193)	(0.206)			(0.197)	(0.0729)	(0.0772)			(0.0873)
Pro. diversification square		1.073			0.600		-0.193			-0.443
		(1.015)			(0.838)		(0.343)			(0.326)
Geographic diversification			0.108	0.205*	0.210			0.101	0.172*	0.104
			(0.105)	(0.124)	(0.143)			(0.0884)	(0.0905)	(0.0911)
Geo. diversification square				0.903**	0.981*				0.672***	0.359
				(0.412)	(0.561)				(0.245)	(0.262)
Pro. X Geo. Div.					0.492					0.373**
					(0.362)					(0.187)
Observations	422	422	420	420	419	461	461	459	459	458
R-squared	0.192	0.074	0.188	0.157	0.096	0.214	0.198	0.175	0.146	0.157
Number of firms	89	89	89	89	89	98	98	98	98	98
Under text (Kleibergen-Paap rk LM)	13.7***	7.447*	15.03***	22.10***	9.901**	18.17***	9.832**	15.14***	17.82***	12.72***

Over text (Hansen J Statistic)	0.495	0.480	1.321	0.748	0.987	0.451	0.369	0.0550	0.0655	0.172

Logarithmic transformation of all continuous variables. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 6. Second robustness check: Regression of firm performance including other interactions between product and geographic diversification.

	EVA/Assets			EBIT/Assets		
VARIABLES	Model 6 FE	Model 7 FE	Model 8 FE	Model 6 FE	Model 7 FE	Model 8 FE
Sales	0.0752***	0.0754***	0.0760***	0.0359***	0.0361***	0.0363***
	(0.0248)	(0.0244)	(0.0247)	(0.0122)	(0.0123)	(0.0124)
Long debt ratio	0.0291	0.0319	0.0376	-0.0641	-0.0649	-0.0595
	(0.0781)	(0.0784)	(0.0794)	(0.0556)	(0.0553)	(0.0563)
Current ratio	0.0633**	0.0617**	0.0583*	0.0847***	0.0848***	0.0830***
	(0.0304)	(0.0306)	(0.0320)	(0.0205)	(0.0204)	(0.0204)
Dummy crisis	-0.0321***	-0.0316***	-0.0315***	-0.0234***	-0.0236***	-0.0234***
	(0.00981)	(0.00974)	(0.00979)	(0.00583)	(0.00585)	(0.00581)
Intangible assets ratio	0.0258	0.0281	0.0183	0.0377	0.0366	0.0298
	(0.0675)	(0.0689)	(0.0714)	(0.0443)	(0.0437)	(0.0426)
% Non-director significant shareholders	0.132*	0.140*	0.141*	0.0618**	0.0580**	0.0640**
	(0.0791)	(0.0776)	(0.0772)	(0.0252)	(0.0243)	(0.0249)
% Executive directors	-0.0945	-0.103	-0.0970	0.180**	0.181**	0.186**
	(0.128)	(0.129)	(0.130)	(0.0784)	(0.0788)	(0.0800)
% Members of the board in other boards	-0.157**	-0.160**	-0.158**	-0.0532	-0.0508	-0.0505
	(0.0729)	(0.0705)	(0.0708)	(0.0325)	(0.0328)	(0.0320)
Product diversification	-0.0847	-0.0570	-0.0666	-0.0227	-0.0358	-0.0345
	(0.0827)	(0.0974)	(0.1000)	(0.0372)	(0.0425)	(0.0449)
Pro. diversification sq	0.127	0.132	0.236	0.101	0.0953	0.202*
	(0.250)	(0.250)	(0.300)	(0.0813)	(0.0861)	(0.109)
Geo. diversification	0.0201	-0.000698	0.0276	-0.0303	-0.0143	-0.0167
	(0.0665)	(0.0478)	(0.0694)	(0.0286)	(0.0280)	(0.0302)
Geo. diversification sq	0.253*	0.271*	0.411**	0.124	0.119	0.242**
	(0.147)	(0.149)	(0.201)	(0.0833)	(0.0873)	(0.0968)
Pro. X Geo. Div.	0.240*	0.169	0.250	0.323***	0.362***	0.398***
	(0.135)	(0.124)	(0.172)	(0.0846)	(0.0780)	(0.0975)
Pro^2 X Geo. Div.	-0.391		-0.383	0.268		0.0788
	(0.583)		(0.613)	(0.243)		(0.272)
Pro X Geo^2. Div.		-0.441	-0.163		0.185	0.302
		(0.541)	(0.648)		(0.264)	(0.328)
Pro^2 X Geo^2. Div.			-1.858			-1.613

			(1.935)			(0.979)
Observations	494	494	494	542	542	542
R-squared	0.147	0.148	0.151	0.281	0.281	0.287
Number of firms	90	90	90	98	98	98

Logarithmic transformation of all continuous variables. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1