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**Diversification strategy, CEO management style and firm performance: An application of Heckman's two-stage method**

Almudena Martínez-Campillo

Roberto Fernández-Gago

University of León

(SPAIN)

**Full address for correspondence:**

Almudena Martínez-Campillo

Facultad de CC. Económicas y Empresariales

University of León

Campus de Vegazana s/n

24071 León (Spain)

Telephone number: (0034) 987291000 Ext: 5476

Fax number: (0034) 987291750

E-mail address: amarc@unileon.es

# **Diversification strategy, CEO management style and firm performance: An application of Heckman's two-stage method**

## **Abstract**

This paper aims to explore whether CEOs' management style as agents or as stewards, which depends on their psychological and situational characteristics, moderates the effect of the diversification strategy on firm performance. After applying Heckman's two-stage method to control econometrically for endogeneity bias in empirical work, results demonstrate that the relationship between diversification and profitability varies significantly depending on the management style of the diversifying CEO.

**Keywords:** Diversification strategy · CEO management style · Firm performance · Heckman's two-stage method

## **1. INTRODUCTION**

The effect of diversification on firm performance is the focus of an extensive research (Denis *et al.*, 1997, 1999; Miller, 2004, 2006; Palepu, 1985; Villalonga, 2004). Despite this research, the empirical evidence is inconclusive (Palich *et al.*, 2000). Thus, new approaches are necessary to investigate the diversification-performance relationship. One option is to consider the moderating role that certain variables can exercise on such a relationship (Hoskisson and Hitt, 1990; Kim *et al.*, 2004). In this paper, we introduce one moderator that does not seem to have been the focus of any previous research: the management style of the CEO that diversifies.

Individuals occupying the CEO position play a major role in a firm since they are the main decision makers and shape the future of the business (Jensen y Zajac, 2004). However, different CEOs' management styles lead to different ways of formulating and implementing diversification and the effects derived from this strategy depend on how it has been formulated

and implemented (Datta *et al.*, 1991; Hoskisson and Hitt, 1990). For this reason, our paper aims to investigate whether the impact of diversification on firm performance depends on the management style of the CEO that engages in such strategy. The study attempts to throw light on this question and its main innovation is to identify a CEO's management style according to the agency-stewardship theoretical framework (Davis *et al.*, 1997, 2004; Chrisman *et al.*, 2007).

The chosen theoretical framework seeks to explain variation in managerial behavior. It argues that a manager may choose to act as an agent or as a steward, and that this choice is contingent on his personal attributes -*psychological factors*- and on his perceptions of the firm that he manages -*situational factors*- (Davis *et al.*, 1997, 2004; Wasserman, 2006). While agent-type managers are self-serving individuals that act opportunistically, steward-type managers are self-actualizing individuals that act pro-organizationally. Drawing on this framework, we assume that CEOs inclined to behave as agents will manage diversification to obtain personal benefits at the expense of firm wealth, whereas CEOs inclined to behave as stewards will use diversification to derive corporate benefits (Fox and Hamilton, 1994).

One other option that might help to strengthen scientific results in the diversification-performance relationship is to apply a more rigorous methodology (Datta *et al.*, 1991; Miller, 2006). In this paper, we use the Heckman's two-stage method because it allows to correct properly some econometric problems traditionally associated to the estimation of the diversification effects such as sample selection bias and endogeneity.

The contribution of this article to the existing literature is as follows. First, the study provides a conceptual advance in bridging the two sets of literatures: the agency-stewardship debate and the diversification-performance relationship. Second, the study extends the applicability of the agency-stewardship debate by recognizing different CEOs' management styles and including this recognition in the empirical testing. Such a debate is one of the most promising lines of inquiry, but little empirical evidence exists to justify its potential (Hoskisson *et al.*, 1999).

Third, the study goes beyond the literature on diversification effects by analyzing whether the diversification-performance relationship depends on the management style of the diversifying CEO. This variable may be a key moderator in such a relationship, since consequences derived from the participation in new activities may be contingent on the way CEOs formulate and implement this strategy (Datta *et al.*, 1991; Hoskisson and Hitt, 1990). Finally, the study also contributes from a methodological perspective by using the Heckman's two stage method to control econometrically for endogeneity bias from self-selection in the diversification-performance relationship.

The structure of the article is as follows. The next section develops the hypothesis under study through a review of the related literature. Section 3 contains the data and empirical methodology. Section 4 reports the results. The final section offers some concluding remarks.

## **2. THEORETICAL FRAMEWORK**

### **2.1 CEO management style within the agency-stewardship theoretical framework**

Agency theory and stewardship theory are both concerned with the role of CEOs in managing firms (Chrisman *et al.*, 2007; Wasserman, 2006). The theories diverge in their predictions, however, about how CEOs will act in this regard because they make very different assumptions about the motivation and behavior of managers.

Agency theory is an economic approach that suggests that CEOs as agents are rational individuals that seek to maximize their own utility at the expense of corporate wealth (Jensen and Meckling, 1976). Although the divergence of interests between ownership and management may differ to varying degrees, agency theory claims that the model of the agent remains as inherently opportunistic; that is, in that there is an ever-present possibility of opportunism, unless it is curbed through controls.

In contrast, the stewardship theory is a psycho-sociological approach that depicts CEOs as stewards of organizations; their management style is such that pro-organizational and collectivist conducts have a higher utility than individualistic and self-serving ones (Chrisman *et al.*, 2007; Davis *et al.*, 1997, 2004). These top managers are responsible for managing heterogeneous organizations with competing stakeholders objectives and make decisions that they perceive to be in the best interest of the group. In such a situation, this theory assumes that a steward that enhances corporate wealth will generally satisfy most stakeholders with competing interest (Wasserman, 2006). While stewardship theory in no way denies that some CEOs may be self-interested, it nevertheless propounds that given a choice between self-serving conduct and pro-organizational conduct, stewards' behavior will not depart from corporate interests. If so, acting cooperatively rather than opportunistically does not imply a lack of rationality (Hernández, 2007).

The agency-stewardship debate posits that a CEO's management style as agent or as steward may be described in terms of psychological and situational factors (Chrisman *et al.*, 2007; Davis *et al.*, 1997, 2004; Wasserman, 2006). Psychological factors refer to the manager's personal characteristics and include work motivation, organizational identification and use of power. Situational factors denote the manager's perception of certain variables concerning the firm that he manages such as management philosophy and organizational culture, particularly the individualism-collectivism and power distance dimensions<sup>1</sup>.

Within this framework, managers are more likely to behave as agents when they work motivated by extrinsic factors (e.g., income, working conditions, status,...), when they have low identification with the company, use institutional power to influence subordinates, and belong to firms with a control-oriented management philosophy and an individualistic and a high power distance culture. In contrast, managers are more likely to become stewards when they respond to intrinsic factors based on intangible needs (e.g., achievement, recognition, responsibility,...), when they identify closely with the firm, use personal power, and work in companies with an

involvement-oriented management philosophy and a collectivist and low power distance culture (Davis *et al.*, 1997, 2004; Hernández, 2007).

## **2.2 CEO management style as a moderator of the diversification-performance relationship**

The real difference between the more successful and the less successful diversifiers can be attributed to the management style of their CEOs (Leontiades, 1986). These top managers may directly contribute to diversification success or failure because they are responsible for formulating and implementing this strategy, and the extent to which potential benefits of diversification are actually achieved depends largely on how effectively it is formulated and implemented (Datta *et al.*, 1991). For this reason, some scholars have explained the importance of considering the CEO's management style when studying the performance consequences of diversification strategy (Datta *et al.*, 1991; Hoskisson and Hitt, 1990). This involves that the agency-stewardship framework might be used to analyze this moderating effect, since the impact of diversification on firm performance may be different under the management of a CEO that acts as an agent than it is under the management of a CEO that acts as a steward.

CEOs inclined to behave as agents will be willing to diversify, even at expense of corporate wealth, when large personal benefits are likely to ensue. Specifically, diversification may allow them to increase their compensation and status in the business community, to reduce their personal employment risk and to become entrenched by directing this strategy in a way consistent with their own skills (Denis *et al.*, 1997, 1999). As a result, CEOs closer to the agent model will place greater emphasis on managerial benefits when managing diversification (Aggarwal and Samwick, 2003). For this reason, they will choose the most adequate strategy (e.g. unrelated diversification) and try to implement the most effective organizational structure, culture and processes to attain such personal benefits, even if this come at the cost of corporate losses (Lane *et al.*, 1998). Consequently, we expect that the closer the management style of the diversifying CEO is to agent model, the lower the effect of diversification will be on firm performance.

In contrast, CEOs inclined to behave as stewards, as individuals prone to serve the good of the firm, are likely to use their position to pursue wealth-maximizing diversification strategies (Fox and Hamilton, 1994; Ramaswamy *et al.*, 2002). Market power, economies of scope and internal market efficiency arguments allow us to explain how diversification can maximize corporate wealth<sup>2</sup> (Palich *et al.*, 2000). Thus, when managing diversification, these top managers will place greater emphasis on corporate benefits derived from any of the above three sources. For this reason, they will formulate the best strategy (e.g. related diversification) and establish the best organization to achieve such benefits, which will have a favorable effect on corporate wealth (Lane *et al.*, 1998). Therefore, we expect that the closer the management style of the diversifying CEO is to steward model, the greater the effect of diversification will be on firm performance.

Capturing the expectations of this study, we claim that the relationship between diversification and performance depends on the diversification-managing style of the CEO engaging in this strategy; that is, on how diversification is formulated and implemented. In short, we propose that:

*H<sub>1</sub>: The management style of the diversifying CEO may moderate the diversification-performance relationship.*

### **3. METHODS**

#### **3.1 Population**

The population of interest comprises Spanish public companies with total sales greater than three million euros and more than 100 employees every year during the period 1997-2001. 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<sup>3</sup>. After applying these restrictions, the final population consists of 1,256 specialized firms in 1997. Of these, 520 companies make the initial decision to diversify during the 1998-2001 period and 736 remain specialized.

### **3.2 Sample and data collection**

The information required to identify the management style of CEOs that diversify is not publicly available. We carried out a mail survey to collect these data between May and July 2003. The questionnaire was sent to the CEOs of the 520 diversifying firms in the population to obtain their psychological and situational characteristics. Furthermore, the questionnaire also inquired about the year they occupied the CEO position. As we knew the year when each firm diversified, we were able to determine whether the manager answering the questionnaire was also the CEO that managed diversification. If this was not the case, the firm was dropped from the sample. Next, CEOs were asked to state the percentage sales in each business segment the year of diversification. 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).

However, *“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). Therefore, each diversifying firm from the sample was paired with one of the 736 specialized firms from the population to avoid the 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. After applying these criteria, the final sample consists of 236 firms, distributed equally between diversifying and specialized companies.

### **3.3 Independent variable**

We measured firm diversification using the entropy index (Jacquemin and Berry, 1979; Palepu, 1985):

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

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 increases with greater diversification and combines objectivity, content and construct validity, and simplicity.

### 3.4 Dependent variable

We measured the effect of diversification on firm performance in terms of variation in return on assets (ROA)<sup>4</sup>. After estimating the average ROA for the 3-year pre- and post-diversification periods, we calculated the percentage change in average ROA of both periods (Jensen and Zajac, 2004). Performance data were taken from the SABI database<sup>5</sup>.

### 3.5 Moderating variable

As there are no empirical tests for the agency-stewardship theoretical framework introduced by Davis *et al.* (1997), the study creates a measure of the CEO's management style. This measure consists of 30 items encompassing the three psychological factors and the three situational factors that define the construct to be measured. The theoretical basis for constructing items is as follows (see Appendix 1):

- *Work Motivation* is measured with a four-item scale according to Maslow's Model of Needs (1954); there are two items on intrinsic needs and two on extrinsic needs.
- *Organizational identification* is quantified using a five-item scale adapted from Mayer and Schoorman's scale (1992).
- *Use of power* is assessed with five items that mirror French and Raven's (1959) five bases of power: legal, reward, coercive, referential and expert. The first three are manifestations of institutional power and the other two of personal power.
- *Management Philosophy* is measured with a six-item scale adapted from Lawler (1986).

- *Organizational Culture* is assessed with a ten-item scale according to Hofstede's (1980) study; there are five items on the *individualism-collectivism* dimension and other five on the *power distance* dimension.

We obtained this information from the questionnaire completed by the CEOs of the 118 diversifying firms in our sample. Managers are asked to rate the importance of each item on a Likert-type scale, using seven-point 'strongly disagree' to 'strongly agree' response options. After recoding inversely formulated items<sup>6</sup>, a low score indicates that CEOs are inclined to behave as agents, whereas a high score indicates that CEOs are inclined to behave as stewards. Our 30-item measure has a Cronbach's alpha of 0.909 and all items load strongly on one single factor (61.01 percent of total variance)<sup>7</sup>.

The study employed data obtained from the questionnaire to construct an index of the CEO's management style for each diversifying firm in the sample. The index is computed by adding together each manager's scores for all 30 items, providing a range of values between 30 and 210. We use a simple addition for at least three reasons: a) information is not available to weight *a priori* any of the items utilized; b) reliability and dimensionality analysis highlight that all items measure the same construct and can be added to provide a single score, and c) a simple addition has the advantage of being clear and allowing easy interpretation. The index obtained was normalized to provide values of between 0 and 100<sup>8</sup>, with CEOs closer to the agent model having the lower values and CEOs closer to the steward model having higher index scores.

Using a continuous variable is justifiable because our aim is to measure CEOs management style more accurately. In fact, Davis *et al.* (1997) point out that their approach assumes that managers choose to act exclusively as agents or as stewards as a first step in establishing the contrast between agency and stewardship theories. However, they also accept that from a practical perspective such an assumption could be viewed as a limitation, as individuals tend not to behave in such a black and white fashion<sup>9</sup>.

### 3.6 Control variables

The analysis utilized the following control variables (Kim *et al.*, 2004; Villalonga, 2004): (a) two variables to identify the corporate governance characteristics of companies the year of diversification; 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 and CEO ownership is limited), and another one to control the *proportion of insiders on the board of directors*; (b) three firm-level economical variables such as *size* (log of total assets), *profitability* (ROA) and *investment* (capital expenditures/sales). We calculate 3-year pre-diversification averages for these variables; (c) a dummy variable that indicates whether firms develop *export activity* in the year prior to the diversification event; and (d) one industry-level variable (four-digit SIC) such as *profitability* (ROA). We calculate 3-year pre-diversification average for this variable. All necessary data to construct control variables were taken from the SABI database.

### 3.7 Model specification

Standard regression techniques are not able to control for the endogeneity bias from self-selection associated with studying the diversification-performance relationship. One solution is to apply the Heckman's (1979) two-stage method. In the first stage, the procedure estimates the selection equation as a maximum-likelihood probit model to analyze the propensity to diversify and calculate the *Inverse Mills Ratio* ( $\lambda_i$ ). In the second stage, the corrected regression equation is estimated by OLS regression to examine the effects of diversification on performance. In this case, the study considers the following selection and regression equations:

$$Y_i = \alpha + \beta_1 D_i + \beta_2 C_i + \beta_3 (D_i \times C_i) + \beta_4 X_i + \varepsilon_i \quad (\text{regression equation}) \quad (1)$$

where  $Y_i$  is the diversifying firm's  $i$  performance;  $D_i$  a diversification index;  $C_i$  an index of the CEO's management style;  $(D_i \times C_i)$  an interaction factor between diversification and CEO

management style;  $X_i$  a vector of control variables and  $\varepsilon_i$  a normal error term. This equation uses data from diversifying firms.

$$DIV_i^* = \gamma Z_i + \mu_i \quad (\textit{selection equation}) \quad (2)$$

where the latent variable  $DIV_i^*$  is observed as:

- $DIV_i = 1$  (the firm  $i$  decides to diversify) if  $DIV_i^* > 0$ , or as
- $DIV_i = 0$  (the firm  $i$  decides not to diversify) if  $DIV_i^* \leq 0$ ;

$Z_i$  is a vector of variables that affect a firm's propensity to diversify (all control variables from the regression equation, since they also relate to the choice to diversify) and  $\mu_i$  is a normal error term. This equation uses data from both diversifying firms and matching specialized firms.

After incorporating the *Inverse Mills Ratio* calculated by using estimates obtained from the selection equation, the final regression equation is:

$$Y_i = \alpha + \beta_1 D_i + \beta_2 C_i + \beta_3 (D_i \times C_i) + \beta_4 X_i + \theta \lambda_i \quad (\textit{corrected regression equation}) \quad (3)$$

#### 4. RESULTS

Table 1 presents means, standard deviations and correlation coefficients for all variables used in this study. Although some variables in the regression equation show a high correlation, the examination of variance inflation factors (VIFs) indicates no evidence of multicollineality.

*Table 1 here*

Table 2 reports the results of our first-stage probit regression. Using the full sample of diversifying and specialized firms, the study proves that firm size and industry ROA affect negatively and significantly on firms' propensity to diversify for the first time, whereas the proportion of insiders on the board of directors, the fraction of firms in the industry that are diversified, firm ROA and export activity have a positive effect.

*Table 2 here*

In the second stage of the Heckman method, the study applies a hierarchical moderated regression analysis in order to test the performance effects of diversification. Table 3

summarizes regression results. All models show that the coefficient of the  $\lambda_i$  variable is not significant, indicating the absence of sample selection bias. Model 1 reports the results for control variables. The coefficient for corporate control is negatively and significantly associated with change in ROA, whereas the proportion of insiders on the board of directors and export activity affect positively and significantly on such a variation.

In Model 2, diversification and CEO management style variables were added. As shown, by controlling for the sample selection bias, diversification strategy *per se* and management practices of CEOs inclined to act as stewards have a substantial direct impact on enhanced firm performance. Furthermore, a significant increase in  $R^2$  of Model 3 compared to Model 2 could indicate a possible moderating effect of the CEO's management style on the diversification-performance relationship (Carte and Russell, 2003). Specifically, the positive and significant coefficient for the interaction term in Model 3 would suggest that the greater the value of the CEO management style variable (i.e., the closer the diversifying manager is to the steward model), the greater the effect of diversification on performance; or alternatively, the lower the value of the CEO management style variable (i.e., the closer the diversifying manager is to the agent model), the lower the impact of diversification on performance. Thus, this result would, *a priori*, appear to confirm our hypothesis.

However, since the correlation between diversification and CEO management style variables is important ( $r_{DC} = -0.31^{***}$ ), the significant moderating effect might be simply a nonlinear effect between diversification and firm performance (Carte and Russell, 2003). This can be checked by adding the quadratic effects of the dependent and moderating variables to regression analysis (Models 4 and 5). Results after controlling for quadratic effects show a significant increase in  $R^2$  of Model 5 compared to Model 4, and an interaction term with a positive and significant coefficient. Both indicators confirm the previously observed moderating effect and provide considerable support for the hypothesis under study.

*Table 3 here*

## 5. CONCLUDING DISCUSSION

The main goal of this paper is to analyze whether CEOs management style may moderate the impact of diversification on firm performance. The study aims to contribute to this unexplored question by testing the applicability of the agency-stewardship theoretical framework to identify the management style of the CEO that diversifies and by using Heckman's two-stage method to control econometrically for endogeneity bias from self-selection.

Results show that CEOs closer to the steward model act to maximize profitability in general and they are particularly influential when managing diversification, whereas CEOs inclined to behave as agents make strategic decisions that reduce profitability in general, and this effect is significantly strong when they decide to diversify. Thus, the closer a CEO's management style is to agent model, the lower the effect of diversification will be on firm performance and the closer a CEO's management style is to steward model, the greater the effect of diversification will be on firm performance. These results confirm that the relationship between this strategy and performance may depend on the diversification-managing style of CEOs; that is, on how they formulate and implement the participation in new lines of activity.

Our results provide general support for the notion that steward-managed firms obtain higher levels of performance from diversification than agent-managed firms. Therefore, the difference between the more successful and the less successful diversifier firms could be attributed to the management practices of their CEOs. In fact, this top managers may contribute to diversification success or failure because they directly and actively participate during the whole process. Indeed, CEOs are responsible for formulating and implementing this strategy and the performance effects of diversification depend largely on how effectively it is formulated and implemented.

Overall, we find evidence that the differences in performance effects stemming from the decision to diversify are not driven by diversification *per se* but rather by the fact that the action

of this strategy on profitability may be modified by the management style of the CEO that diversifies, whatever the level of diversification achieved. These findings highlight that the impact of diversification on performance is not homogeneous across all CEOs managing diversification. CEOs management style has implications on the way they exercise their power and hence on their way of formulating and implementing diversification, which is reflected in profitability benefits derived from this corporate strategy.

The findings also indicate that there are gains to be obtained by considering the gamut of human behaviors. Although agency problems certainly exist if agent-type CEOs manage diversification, such problems disappear when CEOs closer to the steward model expand firms' operations to maximize corporate wealth. Thus, the study shows that self-interest is not the only valid managerial behavior behind diversification.

Despite certain limitations to the study, such as assuming that diversification always coincides with CEOs' preferences or that their profile remains constant over time, this article may be relevant to both researchers and practitioners. For researchers, the contradictory findings of the diversification-profitability relationship may be partially explained by considering that such a relationship may be contingent on how diversification is formulated and implemented and, more specifically, on whether the CEO that diversifies is more inclined to manage as agent or as steward. For practitioners, our results reveal that whenever diversifying firms stress profitability, it is important to foster the conditions under which stewardship relationships can flourish. Firms should therefore ensure that individuals selected to the post of CEO have a psychological profile that predisposes them to behave as stewards. Moreover, firms should pay particular attention to implementing the situational conditions that are necessary to guarantee the pro-organizational behavior of their top managers.

## APPENDIX 1

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### Measure items of CEO management style

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<b>IM1</b>	It is important for me to get the recognition I deserve when I do a good job
<b>IM2</b>	I need to feel proud of my own work
<b>EM3</b>	I like hard work to earn a lot of money
<b>EM4</b>	It is important for me to get promotion at work and have security of employment
<b>ID1</b>	I am committed to the goals of this organization
<b>ID2</b>	I really do not care what happens to this organization
<b>ID3</b>	I am proud to tell others that I am part of this organization
<b>ID4</b>	I find that my values and the organization's values are very similar
<b>ID5</b>	I am not willing to put in a great deal of effort beyond that normally expected for helping this firm
<b>PP1</b>	Employees acknowledge my experience when they have to comply with my orders
<b>PP2</b>	Employees identify with me and try to act as I do
<b>IP3</b>	I gain my obedience through sanctions and threats
<b>IP4</b>	I reward employees that act as I want
<b>IP5</b>	I use my authority to ensure that employees accomplish their duties
<b>MP1</b>	Within the firm there is a strict control over how employees do their work and the results obtained
<b>MP2</b>	The firm confronts increased uncertainty through more empowerment in employees
<b>MP3</b>	Employees not only carry out their work, but organize and control it
<b>MP4</b>	There is a low level of trust throughout this firm
<b>MP5</b>	Employees do not have the freedom to decide how they are going to carry out their work
<b>MP6</b>	There is fluent communication between employees and management team within this firm
<b>IC1</b>	The company's members may be expected to give up their goals in order to benefit group success
<b>IC2</b>	The firm lacks team spirit
<b>IC3</b>	Firm success is usually attributed to all its members
<b>IC4</b>	There is a cooperative atmosphere in this firm to benefit group success
<b>IC5</b>	Employees' individual development and independence is encouraged in this firm
<b>DP1</b>	The main function of the employees is to follow instructions given by the management team
<b>DP2</b>	The management team takes most decisions after consultation with subordinates
<b>DP3</b>	The company's members are encouraged to express their own ideas and opinions
<b>DP4</b>	Individuals at the top have much more power than individuals lower in this firm
<b>DP5</b>	Employees can disagree with management decisions

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### Variables Code

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<b>IM</b>	Intrinsic Motivations
<b>EM</b>	Extrinsic Motivations
<b>ID</b>	Identification with the firm
<b>PP</b>	Personal Power
<b>IP</b>	Institutional Power
<b>MP</b>	Management philosophy
<b>IC</b>	Individualism/Collectivism
<b>PD</b>	Power distance

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## NOTES

[1] A detailed study on how each psychological and situational factors affects on the management style of managers may be found in Davis *et al.* (1997, 2004).

[2] From a market power perspective, diversified firms can employ a number of mechanisms, such as predatory pricing, cross-subsidization, entry deterrence and reciprocal buying and selling, to blunt the efforts of competitors and increase their own economic power in the market place. From a scope economies perspective, diversified firms can distribute the costs of assets by spreading their usage across two or more product lines. From an internal market efficiency perspective, they can access internally generated surplus funds that should be less costly than

[3] These industries were excluded to avoid possible distortions caused by their special functioning and regulation.

[4] We choose one accounting-based measure of firm performance. Market value-based measures may be considered more complete indicators of the effects of corporate strategies on performance. However, 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 sectors of our national stock market advised against this approach.

[5] The SABI database is similar to that of COMPUSTAT in the USA, although the firms in this database do not need to be listed on the stock market.

[6] Items inversely formulated are ME3, ME4, ID2, ID5, PI3, PI4, PI5, FG1, FG4, FG5, IC2, IC5, DP1, DP4.

[7] The CEO management style measure satisfies the general requirements of reliability and convergent validity for research instruments. Divergent validity does not proceed because all items load strongly on one single factor.

[8] The following expression was used to standardize the index obtained:  $[(X_i - X_{\min}) / (X_{\max} - X_{\min}) \times 100]$ , where  $X_i$  is the value of the index that is to be standardized and  $X_{\min}$  and  $X_{\max}$  are the minimum values (30) and the maximum (210) that can be reached in the index, respectively.

[9] Lubatkin *et al.* (2007) also portray opportunism, i.e., self-serving behavior, and good stewardship as polar ends of a continuum.

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

<i>Selection equation</i>										
<i>Variables (N = 236)</i>	<i>Mean</i>	<i>S.D.</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>
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.Firm ROA	4.51	9.55	0.11†	0.05	0.01	0.04	1.00			
6.CAPEX/Sales	0.45	0.70	-0.06	0.11	0.05	0.02	0.02	1.00		
7.Export activity	0.57	0.49	0.18**	-0.10	0.17**	-0.02	0.04	0.05	1.00	
8.Industry ROA	-1.84	22.85	-0.16**	-0.09	-0.07	0.19**	0.03	-0.07	-0.05	1.00
9.Fraction diversified firms	6.27	3.19	0.15*	0.03	0.01	0.02	0.07	-0.11†	0.02	-0.03

  

<i>Regression equation</i>											
<i>Variables (N = 118)</i>	<i>Mean</i>	<i>S.D.</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>
1.Change in ROA	0.17	1.46	1.00								
2.CEO style	50.14	13.70	0.31***	1.00							
3.Diversification	0.75	0.41	0.25**	-0.31***	1.00						
4.Corporate control	1.23	0.42	-0.20**	-0.04	-0.14	1.00					
5.Insiders proportion	19.39	31.28	0.45***	0.10	0.08	0.35***	1.00				
6.Log of total assets	16.74	1.16	-0.05	0.10	-0.13	-0.01	0.04	1.00			
7.Firm ROA	5.30	12.19	0.06	0.04	0.06	0.09	-0.03	0.07	1.00		
8.CAPEX/Sales	0.41	0.57	-0.04	0.03	-0.03	0.03	-0.07	0.05	0.01	1.00	
9.Export activity	0.67	0.41	0.34***	0.17†	0.05	-0.09	0.27**	0.09	0.05	-0.01	1.00
10.Industry ROA	-5.60	20.94	0.02	-0.04	0.01	-0.11	-0.01	0.06	0.08	-0.12	-0.03

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

**Table 2. First-stage probit regression predicting propensity to diversify**

<i>Variables</i>	<i>Coefficients</i>	<i>S.E.</i>	<i>z-Statistic</i>
Constant	4.52***	1.40	3.23
Corporate control	-0.39	0.27	-1.45
Insiders proportion	0.01**	0.01	3.03
Log of total assets	-0.29***	0.07	-3.68
Firm ROA	0.02†	0.01	1.91
CAPEX/Sales	-0.13	0.12	-1.03
Export activity	0.40**	0.18	2.15
Industry ROA	-0.02**	0.01	-2.13
Fraction diversified firms	0.07**	0.03	2.48
Number of total observations			236
Number of censored observations			118
Log-likelihood test statistic			-137.19***
Pseudo-R <sup>2</sup>			0.16

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

**Table 3. Hierarchical regression analysis: Effect of diversification on firm profitability**  
Dependent variable: Change in ROA

<i>Variables</i>	<i>Model 1</i>	<i>Model 2</i>	<i>Model 3<sup>a</sup></i>	<i>Model 4<sup>a</sup></i>	<i>Model 5<sup>a</sup></i>
Constant	2.82 (2.05)	0.77 (1.96)	3.17 † (1.88)	3.04 (1.92)	3.09 † (1.87)
Corporate control	-1.34*** (0.31)	- 1.14*** (0.29)	-1.08*** (0.29)	-1.14*** (0.29)	-1.14*** (0.29)
Insiders proportion	0.02*** (0.01)	0.02*** (0.01)	0.02*** (0.01)	0.02*** (0.01)	0.02*** (0.01)
Log of total assets	-0.11 (0.14)	-0.15 (0.13)	-0.14 (0.13)	-0.14 (0.13)	-0.14 (0.13)
Firm ROA	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
CAPEX/Sales	0.04 (0.20)	-0.01 (0.18)	0.04 (0.18)	-0.01 (0.18)	0.05 (0.18)
Export activity	0.49 † (0.29)	0.43 † (0.27)	0.36 (0.27)	0.45 † (0.27)	0.42 † (0.27)
Industry ROA	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Diversification		0.88*** (0.26)	0.98*** (0.26)	0.86*** (0.27)	0.89*** (0.27)
CEO style		0.03*** (0.01)	0.03*** (0.01)	0.03*** (0.01)	0.04*** (0.01)
Diversification x CEO style			0.03 † (0.02)		0.05* (0.02)
Diversification <sup>2</sup>				0.11 (0.41)	0.66 (0.48)
CEO style <sup>2</sup>				-0.01 (0.01)	-0.01 (0.01)
Inverse Mills Ratio ( $\lambda_i$ )	-0.06 (0.72)	0.23 (0.66)	0.03 (0.66)	0.25 (0.68)	0.13 (0.66)
Wald <sup>b</sup>	$\chi^2$ (14) = 77.00***	$\chi^2$ (16) = 107.06***	$\chi^2$ (17) = 112.74***	$\chi^2$ (18) = 107.19***	$\chi^2$ (19) = 115.65***
R <sup>2</sup>	0.398	0.495	0.508	0.496	0.516
$\Delta R^2$			0.013 †		0.020*

<sup>a</sup> The two continuous variables used in interaction terms were centered. Results are similar if uncentred.

<sup>b</sup> Wald test is a  $\chi^2$  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

