

# Ownership structure, corporate value and firm investment: a Spanish firms simultaneous equations analysis\*

**Abstract:** In recent years the research about the relationship between firm ownership structure and value creation has increased. Although there is a close link between ownership and corporate value, latest literature have proved this link not to be so direct as expected. Moreover, the relationship between corporate value and ownership might be affected by firm investment, so that investment would become a mechanism potentially transmitting the effects of ownership on firm value. At the same time, it is more and more widely accepted that firm market value is not only the result of firm investment projects but there are some other issues potentially affecting such as financial structure or dividend policy. All together, these factors make up the firm governance and control structure and become relevant in terms of firm market value.

In this paper, we are concerned with this set of mutual relationships and the possible endogeneity of ownership structure. In order to deal properly with them, we aim to test the mutual impact of investment, corporate value and ownership by broadening the usual framework with a simultaneous equations approach. Using a sample of 140 Spanish listed companies for the 1991-1997 period, we find that, consistent with previous research, the alignment and entrenchment hypothesis seem to be confirmed by one-equation model estimation. However, when the analysis is carried out by the estimation of a system of simultaneous equations in which the set of mutual relationships is introduced, results are quite different. Although both firm valuation and investment are determined by managerial ownership, our results detect that ownership structure may be an outcome of investment and value too. Consequently, it is not completely right to infer that ownership structure unidirectionally determines firm value, but we should broaden the benchmark in order to take explicitly into account the mutual links between firm value, investment and ownership.

Félix J. López Iturriaga\*\*  
Juan Antonio Rodríguez Sanz

Universidad de Valladolid  
Facultad de Ciencias Económicas y Empresariales  
Avda. Valle del Esgueva 6  
47011 Valladolid  
España

Tel. +34-983-423000 Ext. 24395  
Fax +34-983-423899

flopez@eco.uva.es  
jantonio@eco.uva.es

---

\* This research has received financial support from the Spanish *Dirección General de Enseñanza Superior e Investigación Científica* (proyecto PB97-0594).

\*\* Correspondence author

## 1. Introduction

In the last two decades a number of papers showing the close relationship between firm ownership structure and value creation has arisen. Among these papers, it is worth stressing those of Morck *et al.* (1988) and McConnell and Servaes (1990). These authors focus on managers' stake on firm ownership as a mechanism decisively impacting on the alignment of interests between firm's owners and managers and, in turn, on the firm market value.

In any case, the ownership structure analysis is the subject of a broad theoretical stream that explicitly takes into account capital markets frictions. In this framework, it is widely accepted that firm market value is not only the result of firm investment projects but there are some other issues potentially affecting such as financial structure or dividend policy. All together, these factors make up the firm control structure and can modify firm market value. When the assumption of capital markets is relaxed, taxes, bankruptcy costs, transaction costs and agency problems become relevant so that the ownership and control structure plays an important role. This new role for the ownership may be explained from two points of view: the agency approach and the asymmetric information approach. On the one hand, the agency explanation underlines the ownership structure as an instrument to alleviate the conflicts of interest between the main firm claimholders. On the other hand, the asymmetric information approach understands the ownership structure as a way to reduce the informational unbalance between insiders and outsiders by disclosing information in capital markets (Leland and Pyle, 1977; Berström and Rydqvist, 1990).

Notwithstanding, the research about the link between managers' ownership participation and firm value is not conclusive and shows two main directions for further research. Firstly, some papers detect a non-monotonic relationship between managers participation and firm value, so that some doubts arise about the *a priori* alignment of interests that managers ownership participation should mean. This is the sense of the so-called alignment and entrenchment hypothesis to justify the opposite effect that managers' ownership may imply (Morck *et al.*, 1988). Secondly, as suggested by Jensen and Meckling (1976), investment decisions can act as a transmission mechanism between ownership and value. If this is the case, the investment is affected by managers' ownership and does impact on firm market value.

Regarding firm investment, one should keep in mind that the Tobin's  $q$  theory of investment is widely known as one of the most successful theories to explain corporate investment policy. In addition, the  $q$  ratio –defined as the market to the replacement cost of assets– is grounded on the theories of value creation too. This net of interrelationship among investment, value creation and ownership structure introduces the concern about the causality and about the possible endogeneity of some of them.

The interrelationship among investment, firm value and ownership structure is precisely the core of our paper, where we try to deal with the possible endogeneity of these issues at the light of recent research (Cho, 1998). We aim to use Cho's methodology to arrive to the factors determining value creation, firm investment and managers ownership, taking as granted the possible endogeneity

and estimating simultaneously all this set of interrelationships. Our results show big differences conditional on the individual vs. simultaneous estimation and point at a significant interconnection among the issues. The results also shed some doubts about the inference achieved by previous research since a misspecification of ownership structure effect could exist. We extend existing work in two directions. First, we test the set of interrelationships in a corporate system such as the Spanish one, quite different to the Anglo-Saxon system, most of the previous research has focused on. In fact, later on, we will present more in-depth some of the features of the Spanish corporate system compared to the Anglo-Saxon one. Second, by combining cross-section data with time series, we have built a panel data that allows us to optimally exploit the informational content of the sample.

To achieve these goals we have divided our paper into five sections, this introduction being the first one. Section 2 surveys previous research and presents theoretical foundations about investment, ownership and value relationship. In section 3 some methodological issues can be found, along with our sample and variables description, while in section 4 we display and comment the results we achieve and report a sensitivity analysis to alternative specifications of the model. In the final section we draw some conclusions from the most outstanding results and point out some future research directions our paper poses.

## **2. Theoretical foundations**

As stated above, we try initially to expose the main explanations and previous research our contribution bases on and, later, we will face the endogeneity and mutual relationship issue. This is why this section has been divided into three paragraphs, each one devoted to one of the basic points we are concerned with: firm value, firm investment and firm ownership structure.

### **2.1. Value creation**

Firm and shareholders' value creation has traditionally been one of the most interesting topics both for academia and practitioners. The contributions stemming from financial theory have never stopped and have kept on providing new insights about the relevance vs. irrelevance debate of financial decisions. Nevertheless, it has not been until recent years that the ownership and control structure has become the core of the value creation process. Morck *et al.* (1988) and McConnell and Servaes (1990), based on contractual reasons, are contributions to explain firm value as an outcome of firm ownership structure and, specifically, of managers ownership.

Going more in depth, the basic foundations come from the idea of firm as a nexus of contracts among the different stakeholders and where the conflicts of interests arising between shareholders and managers are specially relevant to determine firm market value (Jensen and Meckling, 1976). The separation between company ownership and control alters the incentives scheme and lead to the interrelationship between ownership structure and firm value through the investment (Cho, 1998; Ang *et al.*, 2000). In the first stage, managers have incentives to extra perquisites consumption at the

expense of the optimal investment policy. In the second stage, this non-optimal investment level affects company valuation by leading firm value to a non-optimal value.

The available empirical evidence (Morck *et al.*, 1988; McConnell and Servaes, 1990; Thomsen and Pedersen, 2000) stresses the asymmetric behavior of firm value depending on ownership and allows to support both the alignment and the entrenchment hypothesis: while for low managers ownership a positive relationship with firm value is found, in high ownership levels some perquisites consumption is detected and, hence, firm value decreases. This same literature underlines the importance not only of the quantitative ownership distribution but also the identity or nature of the main shareholders.

The relationship between ownership and value has been explained for the sake of information disclosure (Leland and Pyle, 1977) too. In this sense, ownership structure may make the investors partakers of information about the firm future investment projects and therefore, affect firm market value. Stulz (1988) also achieves analogous conclusions through the corporate control market and by broadening ownership structure to incorporate voting rights distribution and its influence on takeovers success.

## **2.2. Investment**

As previously mentioned, investment is one of the most relevant channels the ownership structure can have any impact on value creation through. Therefore, in addition to the influence of managers' ownership on investment, we should identify some other factors potentially affecting the investment the companies undertake.

As far as ownership influence is concerned, there are a few proofs of a direct and non-monotonic relationship between firm investment and ownership structure (Cho, 1998; Hadlock, 1998). In spite of this fact, most of the research has followed an indirect path by identifying the investment financial constraints due to the ownership structure (Devereux and Schiantarelli, 1990; Hoshi *et al.*, 1990a and 1991; Ramirez, 1995). When financial constraints tighten a connection between investment and some ownership issues such as ownership dispersion or the main shareholders nature is found.

Ownership structure becomes a factor altering fund availability and, therefore, the set of investment projects at the reach of the firm. This link between ownership structure and asymmetric information is the channel through which some issues as firm internal resource generation (Calem and Rizzo, 1995; Calomiris and Hubbard, 1995; Kaplan and Zingales, 1995), firm liquidity (Fazzari *et al.*, 1988; Hoshi *et al.*, 1990b) or firm debt (Calormiris *et al.*, 1994; Lang *et al.*, 1995) turn out to be prominent. Broadly speaking, most of the literature confirms a positive relationship between  $q$  ratio and investment, although it is not so significant and consistent as expected.

### 2.3. Ownership structure

Ownership determinant factors have been scarcely studied by financial literature. Instead of it, the most usual approach is that one considering the ownership structure as exogeneous or explanatory of other firm aspects. However, the contributions focused on the factors affecting the ownership structure have highlighted the impact that firm size and uncertainty have on the managerial ownership proportion and on the percentage of shares owned by blockholders (Demsetz and Lehn, 1985). At the same time, the ownership structure has been proved to depend on firm size (Lange and Sharpe, 1995) or performance (Berström and Rydqvist, 1990).

Notwithstanding, most of the papers based on ownership structure have considered the ownership structure as an exogenous or explanatory variable. It is worthy keeping in mind this evidence since it might help to trace the link between ownership structure and some other firm issues. In fact, most of this topic concerning literature has analyzed the positive effect that managerial ownership has on value creation (Chen, 1990; Morck *et al.*, 1988; McConnell and Servaes, 1990). Some other papers are involved in other corporate finance issues such as the link with investment risk (Agrawal and Mandelker, 1987), with leverage (Agrawal and Mandelker, 1987; Agrawal and Nagarajan, 1990) or with dividend payout (Chen and Steiner, 1999).

## 3. Research design

### 3.1. Sample

Our sample includes 140 non-financial Spanish companies publicly traded in capital markets for the 1991-1997 period (more or less, two-thirds out of the whole number of quoted companies). The sample selection process has been led by market data significance and ownership structure information availability<sup>1</sup>. The combination of the 140 companies for seven years has allowed us to form an unbalanced panel data to be dealt with by the appropriate panel data methodology (Mátyás and Sevestre, 1992). Given that the panel is not balanced –that is to say, not all the data were available every year–, the total number of observations is 764. The source of information has been the *Comisión Nacional del Mercado de Valores* (Spanish Stock Exchange Commission), hereinafter CNMV. All the data were publicly available and were obtained from the Companies Register, the Significant Ownership Participation Register and from the Audited Financial Statements.<sup>2</sup>

As shown in table 1, the companies in the sample are basically medium-to-large companies relative to the mean Spanish firm size either in terms of sales or assets. The sample composition is quite industry-balanced, with a slight bias towards *Building* firms at the expense of *Trade and retailing*

---

<sup>1</sup> In the Spanish stock market there are a number of quoted companies whose shares are traded only a few days every year and, hence, their value cannot be taken as significant. Additionally, ownership data disclosure is quite constraining since only a fraction of all the quoted companies report information about ownership structure. This is why, in spite of having market data about 200 companies, only 140 were included in the sample.

<sup>2</sup> The original names of the databases are the *Registro de Empresas*, the *Registro de Participaciones Significativas en el Capital* and the *Estados Financieros Auditados*.

companies. This proportion is explained by the heavier concentration of *Building* firms in the Spanish market.

Table 2 displays some illustrative data about Spanish companies ownership structure. We have classified the main shareholder status into five different categories: another domestic firm, a multinational firm, a family or private individual or group, a bank and the State. Some characteristics of the Spanish corporate system should be kept in mind. The Spanish corporate system has much in common with European corporate governance models and does not show so much ownership and control specialization as the Anglo-Saxon one. In Spanish companies, like in other European countries, ownership is more concentrated (Allen and Gale, 1994; Berglöf, 1990), there are significant blockholders (Becht and Röell, 1999) and banks play an active role in funding and monitoring (Prowse, 1994).

At the sight of this table, three features should be stressed: (1) The outstanding fraction of shares owned by corporate board directors (on average, they own 18.94% of total shares and, in family-controlled firms they own 37.35%). If the comparison is set in terms of natural people, results are a bit lower but conclusions remain unchanged. (2) The outstanding fraction of shares owned by the main shareholder (the average main shareholder fraction of total shares is 44.45%; this percentage increases until more of half of the shares for State or multinational owned companies). This implies a majority control such as that one of France, Germany or Italy and different from the U.S. system (Berglöf, 1990; La Porta *et al.*, 1999; Prowse, 1994); (3) The importance of other companies –either domestic or multinational firms– (24.21% and 24.33% of the companies) as the main shareholder relative to the State (only 12.59%).

Compared to Anglo-Saxon companies these features mean a lower ownership and control separation. On the one hand, agency problems stemming from ownership and control separation could be smaller than US companies. But, on the other hand, some problems such as risk concentration, the foregoing of specialization advantages (managers ability, specific investment, etc.) in face of profitable growth opportunities (Burkart *et al.*, 1997) or minority shareholders expropriation (La Porta *et al.*, 1999) could arise.

### **3.2. Variables**

The information about the firms of the sample provided by the CNMV allows defining a number of variables that can be divided into four groups: (1) firm market valuation, (2) firm investment, (3) the ownership structure and (4) control variables. Let us describe briefly some issues related to the specification of the variables and some of their most informative statistics. In the appendix a glossary of all the variables and how they have been constructed can be found, whereas Table 2 displays some of their basic statistics.

Firstly, and as far as value creation is concerned, we have used the financial  $q$  or market-to-book asset ratio ( $Q$ ). Tobin's  $q$  ratio would have been preferable with no doubts. Nevertheless, the

problems related to debt market and asset replacement value calculation are extremely demanding and advice other correlated measures. By the contrary, financial  $q$  stems from an easy calculation and provides a highly correlated with Tobin's  $q$  value creation index.<sup>3</sup>

Regarding the investment –the second key variable of the research–, it has been measured by two different variables: investment in Property, Plant and Equipment (INVP) and investment in long-term intangible assets (INVIN)<sup>4</sup>. For every year INVP has been computed as the incremental value of Property, Plant and Equipment (hereinafter PPE) plus depreciation and amortization, whereas INVIN has been computed as the incremental value of intangible assets plus depreciation. Both variables have been normalized by book asset value.

Ownership structure has been introduced by the proportion of total shares owned by the members of the board of directors (ALFA). This variable obviously proxies the incentives that the directors have to perform an efficient monitoring task. Since not all the directors are executives and there are a number of managers no sitting at the board, ALFA is just a proxy of managers' ownership. A more accurate variable would have been the proportion of shares in the hands of all the managers. However, companies do not report managers but directors' ownership, so this is the closest available proxy to managers' incentives.

As repeatedly illustrated by the literature, the link among ownership distribution and other firm aspects may be conditional on the level of insider ownership in some specific moments. This is why, following Morck *et al.* (1988), we will undertake a piecewise analysis by defining some significant break-points or thresholds. As a result of it, we have defined three variables (INSI1, INSI2 and INSI3) aimed to reflect the different influence that ownership structure could have depending on the level of managerial ownership. INSI1 equals the percentage of the shares owned by the directors provided that this percentage is less than 20%. Otherwise, INSI1 equals 20%. INSI2 is defined as equaling the percentage of managerial ownership less 20% provided that directors do not have more than 50% of the shares. Otherwise INSI2 equals 30%. Evidently, if insider ownership is less than 20%, INSI2 is zero. Finally, INSI3 is computed as the percentage of shares owned by directors less 50% if managerial ownership is higher than 50%; otherwise INSI3 is zero.<sup>5</sup>

In addition, we have introduced a set of control variables as factors likely affecting firm performance or investment. All these variables will be incorporated in all the regressions, what should be kept in mind in case some of them sometimes were seen as irrelevant or lacking of theoretical rationale. In any case, the control variables significance is not the core of the paper and tries just to avoid an omission bias, so the inclusion of them has no any other relevance.

---

<sup>3</sup> Chung and Pruitt (1994) compare the financial  $q$  values with Lindenberger and Ross (1981) Tobin's  $q$  values. Results show that, at least 96.6% of Tobin's  $q$  is explained by financial  $q$ .

<sup>4</sup> Instead of the investment in intangible assets, we would have liked to work with R&D expenses. Unfortunately, companies do not report that information to the CNMV, so we have been forced to look for some proxies.

The first control variable concerns capital structure and is defined as equity-to-debt book value. Other control value is firm size. It is usual to measure firm size as assets value. Nevertheless, given that we have used assets book value as the denominator to normalize the investment variables and the financial  $q$  ratio, was firm size measured with error, there could be a spurious negative relationship. To alleviate this problem we compute firm size as the logarithm of assets book value (LogAST). Another relevant aspect the control variables should take into account is firm liquidity (Fazzari *et al.*, 1988; Hoshi *et al.*, 1990b). It has been computed by the short term assets to total assets ratio (LIQ). The last control variable is an indicator of firm profitability in order to introduce the impact of profitability on firm's value and firm's investment; the selected variable has been the return on assets (ROA). Along with these variables a set of dummy variables concerning the industry the firm belongs to was added.<sup>6</sup>

### 3.3. Methodology

The methodology to empirically test the proposed relationships is articulated into two steps. Firstly, we estimate one single equation multivariate models for value creation, investment and managerial ownership. The equations to be estimated are:

$$Q_{it} = \beta_0 + \beta_1 \text{INSI1}_{it} + \beta_2 \text{INSI2}_{it} + \beta_3 \text{INSI3}_{it} + \varepsilon_{it} \quad [1]$$

$$\text{INV}_{it} = \beta_0 + \beta_1 \text{INSI1}_{it} + \beta_2 \text{INSI2}_{it} + \beta_3 \text{INSI3}_{it} + \varepsilon_{it} \quad [2]$$

One has to bear in mind that one of the purposes of our paper is determining the scope of the ownership structure influence. With this aim, we will initially estimate equation [1], where firm value is made to depend on the ownership structure (the two left side columns in Table 3). Since some doubts have recently raised about the direction this causality runs (Cho, 1998), we will test the effect of the  $q$  ratio on managerial ownership too in order to make sure of the causality direction (the two right side columns in Table 3).

Based on those results, the second step of the analysis tries to achieve a more in depth knowledge about the mutual relationship among investment, ownership structure and market value. The rationality underlying is to discern at least partially, the possible endogeneity of the ownership structure or, in a word, the extent to which ownership structure may be an outcome of firm value and investment. The second step is the estimation of the system of simultaneous equations including the three issues. In so acting we can check, by comparison with the single equation models results, the possible endogeneity of ownership and the direction of causality. Therefore, the system of simultaneous equations consists of the following equations:

---

<sup>5</sup> These levels of ownership could be considered too high relative to some previous research. Notwithstanding, these break-points make sense because, as reported in previous sections, Spanish corporate system is characterized by highly concentrated ownership.

<sup>6</sup> The industries are Food and Beverage, Building, Property, Transportation and Communication, Electrical, Chemicals, Metal-mechanical, Mining, Textile and Paper, Automobile and Trade and Retailing.

$$Q_{it} = \beta_0 + \beta_1 \text{INSI1}_{it} + \beta_2 \text{INSI2}_{it} + \beta_3 \text{INSI3}_{it} + \beta_4 \text{TINV}_{it} + \varepsilon_{it} \quad [3]$$

$$\text{TINV}_{it} = \beta_0 + \beta_1 \text{INSI1}_{it} + \beta_2 \text{INSI2}_{it} + \beta_3 \text{INSI3}_{it} + \beta_4 Q_{it} + \varepsilon_{it} \quad [4]$$

$$\text{ALFA}_{it} = \beta_0 + \beta_1 \text{TINV}_{it} + \beta_2 Q_{it} + \varepsilon_{it} \quad [5]$$

Finally, a paragraph with a sensitivity analysis has been included. The purpose of this analysis is to check the robustness of the results to different variables and specifications of the model.

## 4. Results

### 4.1. Corporate value regression results

The initial step has been the estimation of a possible non-monotonic relationship between firm value and managerial ownership as represented in equation [1]. As reported in the first column of Table 3, a certain relationship between both types of variables seems to exist, so that firm value increases with insiders ownership when managers own either less than 20% or more than 50% of total shares. On the contrary, if insider ownership is between 20% and 50%, a negative relationship is found. The estimators are only statistically significant for INSI2 and INSI3. These results are totally consistent with those of Cho (1998) and Morck *et al.* (1988).

Another estimation was run where all the above mentioned control variables have been included. As reported in the second column (Table 3), ownership variables keep on being significant -INSI2 is even significant to a higher level of confidence- and firm size and leverage come out as significant determinants of firm value, consistent with previous evidence for Spain (Andrés *et al.*, 2000). As regards to the explanatory power -adjusted-R<sup>2</sup> coefficient-, the inclusion of control variables makes it notably increase, changing from 38% to 59%.

The Hausman test implies rejecting, to a high confidence level, the null hypothesis of no correlation between the individual fixed effects term and the random perturbation. When no correlation is found -fixed effects model-, it is pertinent the *within groups* estimation in order to optimally take advantage of the panel data dynamic dimension (Mátyas and Sevestre, 1992). In other terms, the Hausman test reveals an unobservable component for each individual. This term is specific to each firm, constant throughout the time and has been highlighted by Himmelberg *et al.* (1999). These last authors stress the large fraction of the cross-sectional variation in managerial ownership explained by the unobserved firm heterogeneity.

So, as a provisional conclusion, the results presented up to now show that our sample is quite consistent with previous research samples. We infer that the corporate value regression results, focused on a continental corporate system such as the Spanish one, corroborate existing evidence from the Anglo-Saxon corporate system.

Despite these preliminary results, there can be some doubts about the kind of relationship between firm value and the ownership structure. This means the question about the direction of

causality of this relationship. To cope properly with such a concern we have run the opposite relationship, where Q variable is the explanatory value, whereas managerial ownership plays the role of dependent variable (the two right side columns in Table 3). As reported, results are not significant at all and firm value seems not to have any serious impact on the firm ownership distribution. Taken together, Table 3 emphasizes the exogeneity of ownership structure: there is a clear link between ownership structure and market value; moreover managerial ownership can be considered a key explanation of this relationship.

#### **4.2. Investment regression results**

To analyze the possible relationship between firm investment and ownership structure, equation [2] has been estimated (Table 4). Whereas the two left side columns report the results for PPE investment, the two right side columns refer to intangible long-term assets investment. The results show the lack of correlation between the ownership structure and firm investment. As reported, both with and without control variables the ownership structure has no noticeable influence on investment. In spite of this lack of significance, one should pay attention to the switching sign of INSI1, INSI2 and INSI3 variables, what could be understood as an indicator of a possible non-linear influence of managerial ownership on firm investment.

The lack of significance remains when the set of control variables is added. In this case, the most outstanding variables are firm size, liquidity and performance. Regarding firm size, the larger the company, the higher the investment. At the same time, assets performance has obviously a positive effect on firm investment. As far as liquidity is concerned, a negative relationship is detected. Although this finding could be initially seen as contradictory, it can be justified by the investment definition. If liquidity proxy is defined as short-term assets (as opposite to long term assets), long term and short term assets could be understood as mutually competitive for the financial resources. This is why, instead of promoting the investment process, firm liquidity becomes a way of using firm funds alternative to PPE or intangible long-term assets.

To sum up, unlike Cho (1998) our results do not support any relationship between insider ownership and firm investment.<sup>7</sup> In turn, in this step of the analysis we could think of a direct relationship between firm value and ownership structure, so that investment has not too much to do with both of them.<sup>8</sup>

---

<sup>7</sup> An additional regression was run where insider ownership was made to depend on firm investment. Results have neither been reported for the sake of brevity nor support any relationship between ownership structure and firm investment. Results are available from the author upon request.

<sup>8</sup> This assertion does not mean that firm value and investment are completely independent. In fact, although not reported, congruent with McConnell and Muscarella (1985), the correlation matrix shows a positive relationship between both variables.

### **4.3. Simultaneous equations system results**

In spite of the number of papers showing a significant effect of ownership structure on firm value, some doubts about the exogeneity of ownership issues have recently been raised. Opposite to Morck *et al.* (1988) and McConnell and Servaes (1990), Demsetz and Lehn (1985), Kole (1994) and Himmelberg *et al.* (1999) contributions demonstrate the endogeneity of ownership structure. In turn, we should wonder if ownership structure could not only affect but also be affected by firm value. This idea is consistent with Murphy (1985) and, specially, with Kole (1994) evidence by suggesting the insiders preference for equity compensation if they expect the market firm value to increase.

In this case, the ownership exogeneity assumption could lead to wrong conclusions about the causality of the ownership-value link. In fact, the “false attribution of causality can lead to a misinterpretation of the relation between ownership structure and corporate value and to incorrect management decisions such as a compensation policy that emphasizes stock grants to the executives” (Cho, 1998, p. 106).

To test this hypothesis, we propose a set of mutual relationships among ownership structure, firm value and investment. From an econometric point of view, the endogeneity of ownership structure means the possibility that previous estimations are misspecified and the necessity of a global analysis of the whole set of relationships through the system of simultaneous equation presented in section 3.3.

It is worthy noticing the inclusion of investment as an explanatory variable in equation [3] and the inclusion of financial  $q$  ratio in equation [4]. As stated, firm investment is likely to be affected by firm performance. So, the higher the market value relative to the book value, the more important the incentives to invest and hence the chances are that there is a positive relationship between  $Q$  and investment.

Concerning equation [3], did the non-linear influence of insiders ownership on firm value hold, the  $INSI1$  and  $INSI3$  coefficients should be positive, whereas the  $INSI2$  coefficient should be negative. At the same time,  $INV$  is supposed to have a positive impact on firm value as long as investment is a way to take advantage of the growth opportunities reflected by the market to book ratio (Berger and Ofek, 1995; Lang and Stulz, 1994; Smith and Watts, 1992).

Analogous explanations can apply to equation [4]. If the previously detected lack of relationship between ownership structure and investment kept on holding, the new estimated coefficients should be non-significant. On the contrary, if a mutual relationship existed, the  $INSI1$ ,  $INSI2$  and  $INSI3$  coefficients should be significant, although their sign is quite difficult to be predicted. As regards to financial  $q$  ratio, the coefficient is supposed to be positive given the positive impact that the market insights of future growth opportunities have on investment.

As for equation [5], it is quite probable that the higher the firm market value, the more interested the managers in owning an increasing proportion of shares. A likely conclusion is the positive influence of  $Q$  on managerial ownership. There is little likelihood to find a direct influence of

investment on insider ownership. However, if we accepted the positive relationship between investment and firm value, we should forecast a positive coefficient for Q variable.

The simultaneous equation system estimation results are displayed in Table 5. The two left side columns refer to PPE investment, while the two right side columns have been estimated with intangible assets investment. Although there are slight differences between both estimations, we can accept that broadly speaking, results are very consistent. As reported, results are notably different to those ones of sections 4.1 and 4.2. and throw serious doubts about ownership structure exogeneity.

Equation [3] exhibits quite similar results to those ones achieved when estimating equation [2]. The non-monotonic relationship between firm value and insiders ownership is confirmed: while INSI1 and INSI3 have positive coefficients, INSI2 has a negative relationship with firm value. Coefficients are significant with a high level of confidence and the significance increases when the set of control variables is added. This could be interpreted as suggesting an omission bias if the control variables are excluded. As forecast, investment is positively related with firm value, although the coefficients are only significant for PPE estimation.

Among the control variables it is worthy underlining the dual role leverage plays. While it has a positive impact on firm value for PPE investment equations, the role is just the opposite for intangible assets investment. This result is not senseless and previous literature has provided related evidence (Smith and Watts, 1992; Gaver and Gaver, 1993; Gul, 1999).

Whereas the single corporate value equation has much in common with that one in the system of simultaneous equations, results coming from the estimation of equation [4] have little to do with those from equation [2]. As reported in Table 5, both PPE and intangible assets investment are strongly determined by firm ownership structure. Firstly –columns 1 and 3–, managerial ownership effect is conditional on the proportion of shares owned by insiders. Although non-significant, INSI1 and INSI3 have a positive effect, while INSI2 impact is negative. This asymmetric relation becomes more evident when adding the control variables. If this is the case, a level of managerial ownership under 20% or over 50% has a positive and significant influence on investment while managerial ownership ranging from 20% to 50% negatively affects firm investment. To some extent these results are consistent with Jensen and Meckling (1976) and Jensen (1986) and highlight the non-linear relationship between investment and ownership. This non-monotonic relationship can be seen as an outcome of a kind of *trade-off* between the overinvestment incentives and managerial ownership incentives.

In equation [4], Q has a positive and significant influence on investment, consistent with previous research (Fazzari *et al.*, 1988; Devereux and Schiantarelli, 1990; Schaller, 1993; Blundell *et al.*, 1992)<sup>9</sup>. Another variable significantly affecting investment is leverage and confirms existing evidence for Spanish capital market (Menéndez, 1996). The rationality underlying this result is

---

<sup>9</sup> There is also consistent evidence focused on the Spanish market (Esteve and Tamarit, 1994; Espitia and Salas, 1986).

leverage as a way to loosen possible financial constraints to investment. The negative influence of liquidity is related to the way this variable was computed as explained in section 4.2.

A caveat before explaining equation [5] should be anticipated. Whereas in equation [3] and [4] a non-linear relationship was tested, in equation [5] the dependent variable is managerial ownership, a continuous variable in which no break points are defined, and this could partially distort the set of estimated relationships. In any case, the outstanding role played by investment and firm value is corroborated, casting some doubts on the supposed ownership structure exogeneity. As forecast, both variables have a positive influence on managerial ownership. Another caveat concerning the whole system of simultaneous equations is the extremely low explanatory power of the model (adjusted  $R^2$  coefficient).

To sum up, let us conclude this section by asserting that ownership structure rather than being an exogenous issue potentially affecting firm value is determined both by firm value and investment. Therefore, previous analysis of the influence of ownership structure on capital structure (Harris and Raviv, 1988), on investment (Schaller, 1993) or on dividend payout (Noronha *et al.*, 1996) could imply certain errors due to not consider the reversal causality. Therefore, we need a whole and simultaneous consideration of all the financial decisions and the ownership structure in order to deal with the mutual relationships.

#### **4.4. Sensitivity analysis and robustness tests**

One of our concerns is the robustness of the results, that is to say, the extent to which the found evidence is contingent upon the equation specification, the variables definition or the method of estimation. This is why we have incorporated a sensitivity analysis section to make sure of the robustness of the results and to avoid the suspicion of spurious correlations. Given the high number of new estimations, only the results for the system of simultaneous equations have been reported for the sake of brevity.

We have firstly proposed an alternative specification of the ownership variables. We have built two dummy variables (INS1 and INS2) equaling 1 or 0 when insider ownership is under 20% or between 20% and 50% respectively (Table 6).<sup>10</sup> As reported, the substitution of INSI1, INSI2 and INSI3 with INS1 and INS2 scarcely affects the results: when insider ownership is under 20% there is a positive correlation between ownership and both corporate value and firm investment. On the contrary, if managerial ownership is between 20% and 50%, a negative relationship is detected. At the same time, both investment and corporate seem to have a positive relationship with managers' ownership. Regarding the control variables, since they keep on playing a similar role, no further comments are required. We would like just to emphasize again the dual role for leverage: it has a positive effect on firm value in the PPE investment system of equations, whereas, its impact is negative when intangible assets investment is considered.

Similarly, we have introduced the percentage of shares owned by managers as an explanatory variable (ALFA). In order to achieve a non-linear specification, in addition to ALFA, we have introduced the squared ALFA variable (ALFASQ). When ownership structure is measured based on ALFA and ALFASQ (McConnell and Servaes, 1990), results remain basically unchanged. Perhaps the most outstanding feature is ALFASQ coefficient: it has the opposite sign to the one of ALFA, although it is not significant (Table 7).

Another alternative specification is that concerning the way to measure firm value. In addition to financial  $q$  ratio, we have used the PER. This ratio has been often used in the literature as a way to incorporate the market point of view about the firm ability to generate cash flows in the future too (Smith and Watts, 1992; Lang and Stulz, 1994; Berger and Ofek, 1995). Consequently, the higher the PER, the better market valuation about firm ability to generate future cash flow relative to the present situation. Results presented in Table 8 are quite coherent, although some ownership structure variables appear as non-significant –especially for intangible investment–, in spite of them keeping keep the expected signs.

As previously exposed, we have also tested the appropriateness of the control variables. Among these ones, the most capable variable to distort the results, in our opinion, is LIQ. This variable, as it has been defined, might be a poor proxy for firm liquidity. This is why we have run the same regressions with the cash flow to total asset ratio instead of LIQ (Table 9).<sup>11</sup> Results, although less significant –especially for intangible assets investment–, are basically consistent with previous ones.

The last alternative analysis concerns the estimation method. Whereas previous regressions were estimated by the two stages least squares method, results reported in Table 10 have been achieved by three stages least squares. Results are again consistent with the hypothesis and come to underline the mutual dependence among corporate value, investment and firm ownership structure. Therefore, our results do not seem to be contingent upon the specification of the model, the variables definition or the method of estimation.

## 5. Concluding remarks

Latest insights about the firm nature whose common basis is the contractual theory and the informational friction stress the role played by the ownership structure. In turn, the firm ownership structure has become relevant in alleviating the conflicts of interest between managers and shareholders and hence, in corporate value creation. In this benchmark, the proportion of shares owned by managers is one of the issues most of the attention has been paid to. In fact, an increase of managerial ownership can help both to align the divergent interests of insiders and outside

---

<sup>10</sup> It is obvious that a third dummy variable for insider ownership over 50% is not necessary. Furthermore, it would prevent the estimation due to multicollinearity problems.

<sup>11</sup> Let us remind the two ways to measure liquidity (stock and flow variables). Cash flow is a flow variable and, in turn, introduces another perspective about firm liquidity.

shareholders (alignment hypothesis) and to strengthen the power of managers to the detriment of outside shareholders (entrenchment hypothesis). The available evidence repeatedly shows a non-monotonic relationship between ownership structure and value creation: there is a positive relationship for low levels of managerial ownership, whereas the relationship switches to a negative sign for high levels of managerial ownership.

Notwithstanding, the link between ownership and corporate value has been proved not to be so direct as expected. Furthermore, firm investment should be taken into account: in a first step, investment seems to be affected by the ownership structure and, in the second step, corporate value can be considered and outcome of firm investment. In spite of this indirect causality, recent research has cast serious doubts on the direction of the causality. This is why, in order to deal with the possible endogeneity of ownership structure, we aim to test the impact of investment and corporate value on ownership. It requires broadening the framework by a simultaneous equations model.

We have tested the above-mentioned ideas for a sample of 140 Spanish listed companies for the 1991-1997 period and have some very significant evidence. Firstly, the one-equation models estimation lead to conclusions quite consistent with previous research. Managerial ownership is found to have non-monotonic influence on firm value, consistent with alignment and entrenchment hypothesis. In addition, ownership structure is detected to impact on firm value and the opposite relationship does not hold: corporate value has no influence on the ownership structure. Another piece of evidence is that referring to investment: as far as our results are concerned, managerial ownership has not any significant effect on firm investment.

However, doubts about the exogeneity of the ownership structure support the need to analyze the interrelationships between corporate value, investment and ownership. This analysis has been carried out by the estimation of a system of simultaneous equations in which the set of mutual relationships has been introduced. Results confirm the intuition and highlight the influence of investment and corporate value on firm ownership. These results are robust to alternative specifications of the ownership structure, the variables included and the estimation method.

On balance, the simultaneous equations analysis seems to illustrate the inappropriateness of considering firm investment and corporate value as a response to the ownership structure. Although managerial ownership usually determines both firm valuation and investment, one should explicitly keep in mind that ownership structure may be an outcome of investment and value too. Consequently, it is not completely right to infer that ownership structure unidirectionally determines firm value, but we should broaden the framework in order to take explicitly into account the mutual links between firm value, investment and ownership. As a direction for future research, one could point to the extension of the analysis by incorporating some others issues such as debt and dividends previous literature has been involved with. In fact, to some extent, some of these features have been introduced in our analysis.

## Appendix

### Variables glossary

Abbreviations: equity market value (EMV); equity book value (EBV); total debt (D); total assets (TA); net income (NI); Property, plant and equipment (PPE); Intangible assets (IA); Depreciation (DP)

Abbreviation		Definition
LEV	$D/(D+EBV)$	Total debt/ Total asset (book value)
ALFA	Directors ownership participation (%)	Directors ownership participation (%)
INVP	$(PPE_t - PPE_{t-1} + DP)/TA$	PPE investment
INVIN	$(IA_t - IA_{t-1} + DP)/TA$	Intangible assets investment
LIQ	Short term assets/TA	Liquidity ratio
LOGMV	$LOG(EBV + D)$	Size proxy
Q	$(EMV + D)/(EBV + D)$	Financial $q$ . Value creation
PER	EMV/NI	Price-earning ratio. Firm valuation proxy

**Table 1: Descriptive statistics**

Descriptive statistics for the 140 Spanish firms data throughout the 1991-1997 period and. Data about ownership variables are also reported in table 2. Assets and sales are in millions of pesetas. 1€ = 166.866 pesetas.

	Mean	Std. dev.	Minimum	Maximum
INVP	0.3123	19.7736	-35.7556	0.9990
INVIN	-0.0283	0.2498	-4.5522	0.8182
INSI1	9.4624	9.0069	0	20
INSI2	7.1427	11.5059	0	30
INSI3	2.8155	8.8972	0	50
logAST	10.4234	1.5913	6.1463	15.2592
LEV	1.6717	4.6350	0.0053	70.3836
LIQ	0.4109	0.2494	0.0008	0.9751
ROA	0.0257	0.1192	-1.7454	0.39588
Q	1.0113	1.6455	0.0004	21.3067
ALFA	19.4207	25.1337	0	100
Assets	77,681.268	319,330.21	29	4,236,416
Sales	38,188.182	125,067.675	0	1,605,101

**Table 2: Corporate ownership descriptive statistics**

Main shareholder fraction refers to the percentage of shares owned by the largest shareholder irrespective his/her status or nature. Directors' fraction is the percentage of outstanding shares owned by the members of the board of directors. Ordinary directors' fraction is the shares held by ordinary people sitting at the board and excluding banks, firms and other legal entities.

	Domestic	Multinational	Family	Banks	State	All
Main shareholder fraction	46.28	58.86	26.03	38.81	53.17	44.45
Directors' fraction	16.79	17.44	37.35	5.38	13.34	18.94
Ordinary directors' fraction	4.07	3.37	33.52	1.91	0.47	9.57
% of companies	24.21%	24.33%	21.79%	17.07%	12.59%	100 %

**Table 3: Ownership structure and corporate value regression**

Results of the panel data estimation of equation [1] are in the two left side columns (the dependent variable is corporate value). The two right side columns report the results for the estimation of ownership structure as a function of corporate value (the dependent variable is the percentage of shares owned by managers). t-statistics are in parenthesis. (\*\*\*) for p-value <1%; (\*\*) for p-value <5%; (\*) for p-value <10%. Hausman test distributes as a chi-squared function with so many degrees of freedom as estimated coefficients.

	Corporate value		Insider ownership	
Intercept	0.6775 *** (2.6314)	2.1699 *** (2.6937)	26.2185 *** (7.3092)	43.0815 *** (3.4099)
INSI1	0.0136 (0.3161)	0.38E-02 (0.0984)		
INSI2	-0.0235 * (-1.7106)	-0.0279 ** (-2.2309)		
INSI3	0.0125 ** (2.4803)	0.0114 ** (2.4737)		
Q			0.5606 (1.0395)	0.1943 (0.35483)
Firm size		-0.1649 ** (-2.2706)		-1.6109 (-1.4361)
Debt		0.0659 *** (11.5803)		-0.2006 (-1.2521)
Liquidity		-0.1964 (-0.5829)		0.2910 (0.05370)
ROA		0.3627 (1.1166)		-3.9344 (-0.6649)
n° obs	132	132	132	132
Adj.-R <sup>2</sup>	0.3806	0.5953	0.524	0.521
Hausman test	19.029 **	40.807 ***	13.074	17.016

**Table 4: Investment regression results**

Results of the panel data estimation of equation [2]. PPE investment estimations are in the two left side columns (the dependent variable is corporate value), while intangible assets investment estimations are in the two right side columns. t-statistics are in parenthesis. (\*\*\*) for p-value <1%; (\*\*) for p-value <5%; (\*) for p-value <10%. Hausman test distributes as a chi-squared function with so many degrees of freedom as estimated coefficients.

	PPE investment		Intangible assets investment	
Intercept	-2.1453 *** (-2.9194)	-0.0297 (-0.7783)	0.49E-02 (0.3984)	-19.4872 *** (-2.8863)
INS11	0.1338 (1.1863)	0.46E-03 (0.6396)	0.13E-02 (1.3109)	0.46E-02 (0.0388)
INS12	-0.0966 (-1.3341)	-0.14E-03 (-0.2239)	-0.10E-02 * (-1.8041)	-0.0366 (-0.3314)
INS13	0.0350 (0.5678)	0.31E-03 (0.2895)	0.12E-02 (1.3074)	0.55E-02 (0.0286)
Firm size		0.87E-02 *** (2.7053)		1.2936 ** (2.3057)
Leverage		0.01E-03 (0.2826)		0.0663 (0.6448)
Liquidity		-0.0628 *** (-3.2005)		-4.1473 (1.2296)
ROA		0.1271 *** (4.6098)		1.5775 (0.2757)
n° obs	140	140	140	140
Adj.-R <sup>2</sup>	0.036	0.1821	0.002	0.032
Hausman test	6.0577	27.657 ***	0.9365	6.1566

**Table 5: Simultaneous equations estimation results**

Results of the system of simultaneous equations estimation by the two stages least squares method. PPE investment results in are in the two left side columns, while intangible assets investment estimations are in the two right side columns. t-statistics are in parenthesis. (\*\*\*) for p-value <1%; (\*\*) for p-value <5%; (\*) for p-value <10%. All the regression include industry dummy variables

Corporate value				
Intercept	-0.1365 (-0.2714)	-0.5534 (-0.3337)	2.1304 *** (5.8875)	5.5221 *** (4.2712)
INSI1	0.2127 ** (1.9678)	0.3153 ** (20.2086)	0.1224 ** (2.0878)	0.3008 ** (2.8310)
INSI2	-0.1986 * (-1.8416)	-0.3282 ** (-2.5912)	-0.2400 ** (-2.4326)	-0.1441 ** (-2.4007)
INSI3	0.2470 (1.5202)	0.4599 ** (2.4527)	0.0637 ** (2.4792)	0.0395 * (1.6272)
Investment	9.5655 ** (2.1161)	4.1043 *** (5.8796)	0.6319 (0.1344)	4.8042 (0.9276)
Firm size		0.0872 (0.7296)		-0.2819 *** (-3.1519)
Leverage		0.1291 *** (6.4721)		-0.1064 *** (-2.5910)
Liquidity		-1.0555 ** (-2.1624)		-0.8248 ** (-2.4548)
ROA		2.0526 ** (2.3443)		2.2526 *** (2.8234)
n° obs	763	754	762	753
Adj.-R <sup>2</sup>	0.002	0.001	0.004	0.009
Investment				
Intercept	0.0734 *** (3.8156)	-0.2230 ** (-2.3061)	-0.0401 (-1.0632)	0.2804 (0.3987)
INSI1	0.53E-02 (1.0906)	0.0230 *** (2.8791)	0.18E-02 (0.2124)	0.3034 *** (3.4396)
INSI2	-0.31E-03 (-0.0644)	-0.0199 *** (-2.8619)	-0.29E-02 (-0.5750)	-0.2940 *** (-3.5198)
INSI3	0.52E-03 (0.0726)	0.0314 *** (3.1541)	0.11E-02 (0.0830)	0.49E-02 *** (3.3670)
Q	0.0170 ** (2.0431)	0.0251 ** (2.4988)	0.38E-02 * (1.8095)	0.3476 *** (4.5969)
Firm size		0.0187 *** (2.9632)		0.26E-02 (0.6745)
Leverage		0.44E-02 ** (2.4985)		0.0204 *** (3.9167)
Liquidity		-0.0714 *** (-3.0025)		-0.33E-02 * (-1.6917)
ROA		0.1603 *** (3.4133)		0.0196 *** (3.2610)
Adj.-R <sup>2</sup>	0.006	0.002	0.016	0.010

---

Ownership structure				
Intercept	0.2666 *** (9.6482)	0.5612 *** (7.0394)	0.2593 *** (10.9838)	0.7685 *** (6.8510)
Investment	1.3901 *** (3.0126)	0.9975 ** (2.0410)	0.9488 * (1.6759)	0.1892 *** (4.0042)
Q	0.0149 (0.6947)	0.0579 *** (2.8129)	0.0526 *** (2.5980)	0.0364 *** (5.2810)
Firm size		-0.0356 ** (-5.1496)		-0.0483 (-1.5941)
Leverage		-0.44E-02 (1.4155)		-0.61E-02 * (1.7253)
Liquidity		0.0290 (1.3901)		0.0317 (0.9321)
ROA		-0.2205 ** (-1.9850)		-0.0417 (-0.7872)
Adj.-R <sup>2</sup>	0.006	0.004	0.015	0.008

---

**Table 6: Simultaneous equations estimation results**

Results of the system of simultaneous equations estimation by two stages least squares method. Ownership structure has been introduced through the INS1 and INS2 dummy variables. PPE investment results in are in the two left side columns, while intangible assets investment estimations are in the two right side columns. t-statistics are in parenthesis. (\*\*\*) for p-value <1%; (\*) for p-value <5%; (·) for p-value <10%. All the regressions include industry dummy variables

Corporate value				
Intercept	0.5639 *** (3.4258)	8.4458 *** (5.8047)	1.9993 *** (7.4991)	4.1262 *** (4.6899)
INS1	1.8282 *** (3.2288)	4.2326 *** (3.1836)	1.3035 (1.4493)	0.1477 * (1.7572)
INS2	-3.6994 ** (-2.2624)	-7.8014 *** (-3.4888)	-6.3005 ** (-2.5174)	-2.9494 *** (-3.2140)
Investment	0.1367 *** (4.1121)	0.2689 *** (5.6957)	44.4651 *** (4.3440)	13.0210 *** (2.7785)
Firm size		-0.7638 *** (-5.2738)		0.1352 *** (6.3173)
Leverage		0.0602 ** (2.0499)		-0.2484 *** (-3.1582)
Liquidity		-1.5409 ** (-2.2690)		-0.6907 ** (-2.0729)
ROA		1.7577 ** (2.1257)		2.1763 *** (2.9509)
n° obs	763	754	762	753
Adj.-R <sup>2</sup>	0.002	0.003	0.019	0.005
Investment				
Intercept	-1.0704 (-0.7633)	-30.4163 *** (-6.5570)	0.0489 *** (8.2395)	-0.3827 *** (-6.0765)
INS1	14.1644 *** (3.8470)	15.9228 *** (2.8768)	0.0459 ** (2.4372)	0.77E-02 *** (5.0861)
INS2	-35.3872 *** (-3.4060)	-35.1037 *** (-3.7793)	-0.1736 *** (-3.3209)	-0.55E-02 *** (4.2806)
Q	5.0030 *** (5.3993)	3.2325 *** (4.9236)	0.0204 *** (7.4672)	0.0259 ** (2.5463)
Firm size		2.8085 *** (6.0283)		0.0240 (5.2124)
Leverage		0.1459 (1.0018)		0.0245 (0.9661)
Liquidity		-5.7043 * (-1.9253)		-0.39E-02 ** (-2.4153)
ROA		16.7083 *** (4.2456)		
Adj.-R <sup>2</sup>	0.006	0.003	0.009	0.005

---

Ownership structure				
Intercept	0.3606 *** (12.3919)	0.0117 *** (8.6420)	0.1420 *** (4.4068)	0.8318 *** (7.5462)
Investment	0.0250 *** (4.7829)	0.0287 *** (6.5475)	3.6758 ** (1.9643)	2.0208 *** (4.5057)
Q	0.1224 *** (5.3501)	0.0825 *** (4.2862)	0.0296 (1.2372)	0.0645 *** (3.0426)
Firm size		-0.0750 *** (-6.9203)		-0.0514 *** (-5.6781)
Leverage		-0.43E-02 (1.2767)		-0.92E-02 *** (2.7037)
Liquidity		-0.1615 *** (-2.6892)		-0.0594 (-1.1274)
ROA		0.0973 (1.5710)		0.1078 (1.0106)
Adj.-R <sup>2</sup>	0.005	0.001	0.004	0.006

---

**Table 7: Simultaneous equations estimation results**

Results of the system of simultaneous equations estimation by the two stages least squares method. Ownership structure has been introduced through ALFA variable. PPE investment results in are in the two left side columns, while intangible assets investment estimations are in the two right side columns. t-statistics are in parenthesis. (\*\*\*) for p-value <1%; (\*\*) for p-value <5%; (\*) for p-value <10%. All the regressions include industry dummy variables.

Corporate value				
Intercept	2.0907 *** (11.6850)	9.4983 *** (7.0705)	0.9303 *** (8.1486)	4.6348 *** (5.0298)
ALFA	0.0379 ** (2.3976)	0.0909 *** (3.8172)	0.0516 * (1.6349)	0.0377 ** (2.1478)
ALFASQ	-0.93E-04 (-0.4399)	-0.32E-03 (-1.1517)	-0.81E-03 (-1.2800)	-0.13E-03 (-0.6004)
Investment	0.1482 *** (4.7861)	0.2053 *** (6.1418)	30.0663 ** (2.2218)	10.0592 ** (2.3438)
Firm size		0.5999 *** (5.8866)		-0.2722 *** (-3.7995)
Leverage		0.0837 *** (3.8085)		-0.1323 *** (-6.8023)
Liquidity		-1.4939 *** (-3.2392)		-0.8063 (-2.7116)
ROA		1.9880 *** (2.6232)		2.3840 (3.4237)
n° obs	764	754	763	753
Adj.-R <sup>2</sup>	0.003	0.001	0.008	0.001
Investment				
Intercept	-13.5595 *** (-10.0889)	-47.1014 *** (-9.1842)	0.36E-02 * (1.62804)	-0.3354 *** (-5.8289)
ALFA	0.3065 *** (3.1424)	0.4574 *** (5.1285)	0.89E-03 ** (2.09412)	0.35E-02 *** (3.2786)
ALFASQ	-0.36E-03 (0.2799)	-0.12E-02 (-0.9715)	-0.62E-05 (-0.7227)	-0.28E-06 (-0.0209)
Q	5.4768 *** (6.6477)	4.6231 *** (8.4245)	0.52E-02 *** (2.7656)	0.0268 ** (2.5381)
Firm size		2.9649 *** (7.4725)		0.0212 *** (4.8902)
Leverage		0.3608 ** (2.7966)		-0.44E-02 *** (-2.6919)
Liquidity		-6.9343 *** (-3.0601)		-0.0291 (-1.1454)
ROA		7.3570 ** (2.1724)		0.1814 *** (3.2359)
Adj.-R <sup>2</sup>	0.001	0.003	0.003	0.003

---

Ownership structure				
Intercept	0.0355 *** (12.8214)	0.9889 *** (6.9050)	0.0449 ** (2.3258)	0.9619 *** (6.8877)
Investment	0.0237 *** (4.8052)	0.0193 *** (4.0609)	6.1729 *** (4.0057)	2.6443 *** (4.5131)
Q	0.0119 *** (5.5651)	0.0810 *** (4.2545)	0.0236 (1.4579)	0.0919 *** (3.6556)
Firm size		-0.0612 *** (-5.4211)		-0.0602 *** (-5.3303)
Leverage		-0.01E-02 *** (2.9531)		-0.0143 *** (3.1890)
Liquidity		0.47E-02 *** (1.3847)		-0.0924 (-1.4799)
ROA		-0.1159 * (-1.8903)		0.0131 (1.2503)
Adj.-R2	0.005	0.006	0.007	0.006

---

**Table 8: Simultaneous equations estimation results**

Results of the system of simultaneous equations estimation by the two stages least squares method. Firm value has been measured by PER. PPE investment results in are in the two left side columns, while intangible assets investment estimations are in the two right side columns. t-statistics are in parenthesis. (\*\*\*) for p-value < 1%; (\*\*) for p-value < 5%; (\*) for p-value < 10%. All the regressions include industry dummy variables.

Corporate value				
Intercept	-217.436 *** (-2.8145)	-428.323 * (-1.8009)	24.3838 *** (8.1087)	-113.503 ** (-2.0411)
INSI1	30.6554 * (1.8857)	43.2189 ** (2.1751)	0.2950 (0.41493)	5.0002 * (1.7263)
INSI2	-17.7177 (-1.1362)	-1.29171 ** (-2.0433)	-1.1435 (-1.2815)	-1.2074 (-0.5988)
INSI3	23.1948 (1.0787)	0.90E-02 *** (1.8953)	2.1727 (1.1542)	1.8060 (0.4350)
Investment	1500.49 *** (3.0873)	1408.29 *** (3.5939)	66.6280 (0.43096)	564.831 *** (2.6839)
Firm size		20.5211 (1.1659)		8.8995 ** (2.2749)
Leverage		1.3681 (0.5050)		0.2959 (0.6445)
Liquidity		135.547 ** (2.0365)		-1.1777 (-0.1172)
ROA		1.3559 (0.0234)		88.2625 ** (2.2635)
n° obs	427	421	426	420
Adj.-R <sup>2</sup>	0.008	0.005		0.008
Inversión				
intercept	0.1464 *** (5.4917)	0.3492 (3.0383)	-0.0157 ** (-2.1605)	0.1574 (1.4081)
INSI1	0.0148 ** (2.0165)	0.0233 ** (2.3867)	0.94E-03 (1.0580)	0.73E-02 (1.1677)
INSI2	-0.51E-02 (-0.7099)	-0.60E-03 ** (-1.9308)	-0.47E-03 (-0.4201)	-0.23E-02 (-0.6356)
INSI3	0.90E-02 (0.91052)	0.42E-05 * (1.8040)	0.28E-02 (1.2008)	0.28E-02 (0.4667)
PER	0.43E-03 *** (2.6879)	0.45E-03 *** (3.3866)	0.24E-03 (0.7332)	0.14E-02 * (1.7166)
Firm size		0.0191 ** (2.1837)		-0.0124 (-1.4275)
Leverage		-0.11E-02 (-0.8315)		-0.39E-03 (-0.5976)
Liquidity		-0.0638 * (-1.9041)		-0.43E-03 (-0.0270)
ROA		0.0213 (0.3000)		-0.1296 (-2.3442)
Adj.-R <sup>2</sup>	0.006	0.008		0.014

---

Ownership structure				
Intercept	0.0239 (0.58015)	0.4771 *** (7.1393)	0.2624 *** (6.8137)	0.4443 *** (4.2179)
Investment	1.5564 *** (3.5431)	-1.0292 *** (-2.6773)	5.8345 *** (5.0872)	2.54922 (0.9602)
PER	0.2545 *** (9.9577)	0.26E-02 (0.0986)	0.75E-02 *** (3.6373)	0.18E-02 (0.6356)
Firm size		-0.0311 *** (-4.8701)		-0.0311 *** (-3.6353)
Leverage		-0.16E-02 (-0.9729)		-0.15E-02 (-0.5876)
Liquidity		0.10E-02 (0.0217)		0.0487 (0.8621)
ROA		0.0291 (0.3107)		-0.0195 (-0.5952)
Adj.-R <sup>2</sup>	0.006	0.040		

---

**Table 9: Simultaneous equations estimation results**

Results of the system of simultaneous equations estimation by the two stages least squares method. Firm liquidity has been measured by cash flow to total asset ratio. PPE investment results in are in the left column, while intangible assets investment estimations are in the right side column. t-statistics are in parenthesis. (\*\*\*) for p-value <1%; (\*\*) for p-value <5%; (\*) for p-value <10%. All the regressions include industry dummy variables.

Corporate value		
Intercept	-0.2033 (-0.0942)	-0.0319 (-0.0190)
INSI1	0.4454 ** (2.4928)	0.2324 * (1.7336)
INSI2	-0.4526 *** (-2.9330)	-0.2553 ** (-2.1784)
INSI3	0.1137 * (1.7066)	0.0725 (1.4128)
Investment	0.1024 *** (3.5714)	1.3614 (0.5853)
Firm size	0.43E-02 (0.0313)	0.0255 (0.2308)
Leverage	0.1185 *** (4.4335)	-0.1210 *** (-5.7470)
Liquidity	-0.3645 (-0.2794)	-0.0277 (-0.0255)
ROA	0.3982 (0.6107)	1.3615 * (1.7162)
n° obs	753	752
Adj.-R <sup>2</sup>	0.001	0.003
Investment		
Intercept	2.6554 (0.1356)	-0.1153 (-0.5684)
INSI1	3.9488 *** (2.9362)	0.0229 (1.5631)
INSI2	-3.9449 *** (-2.5603)	-0.0206 (-1.2418)
INSI3	0.9823 * (1.6218)	0.40E-02 (0.6302)
Q	7.4663 *** (5.2233)	0.0129 (0.5852)
Firm size	-0.0104 (-0.0082)	0.0126 (0.9577)
Leverage	-0.8879 *** (2.9475)	-0.31E-02 (-0.8408)
Liquidity	2.6682 (0.2245)	-0.1632 (-1.3368)
ROA	4.5709 (0.5986)	
Adj.-R <sup>2</sup>	0.008	0.002

---

Ownership structure		
Intercept	0.6380 (6.6056)	0.6345 (7.2978)
Investment	0.39E-02 (1.2433)	0.3712 (1.4623)
Q	0.0388 * (1.9175)	0.0362 * (1.7748)
Firm size	-0.0364 *** (-4.4585)	-0.0371 *** (-4.7010)
Leverage	0.06E-02 (0.2155)	0.12E-02 (0.4282)
Liquidity	-0.2192 ** (-2.0135)	-0.1445 (-1.2335)
ROA	-0.0303 (-0.3376)	0.0113 (0.1196)
Adj.-R <sup>2</sup>	0.011	0.015

---

**Table 10: Simultaneous equations estimation results**

Results of the system of simultaneous equations estimation by the three stages least squares method. PPE investment results in are in the two left side columns, while intangible assets investment estimations are in the two right side columns. t-statistics are in parenthesis. (\*\*\*) for p-value <1%; (\*\*) for p-value <5%; (\*) for p-value <10%. All the regressions include industry dummy variables.

Corporate value				
Insi1	0.3284 *** (3.2303)	0.7477 * (1.7975)	0.0188 (0.4522)	0.2251 ** (2.0581)
INSI2	-0.1172 *** (3.1986)	-0.0480 * (-1.7865)	-0.0431 (-0.7675)	-0.7432 * (-1.7619)
INSI3	0.0121 (0.9397)	0.1910 * (1.7738)	0.0218 (0.6273)	0.0124 (0.4594)
Investment	6.4925 * (1.8788)	7.8548 (1.4335)	7.8812 ** (2.0152)	14.9344 (1.0454)
Firm size		-0.0966 ** (-2.1085)		0.0826 ** (2.0668)
Leverage		0.1588 *** (5.1923)		-0.1873 *** (-5.7395)
Liquidity		2.5938 ** (2.3718)		1.0229 (0.9311)
ROA		16.1338 *** (3.1908)		2.7699 *** (3.9301)
n° obs	763	754	762	754
Adj.-R2	0.002	0.025	0.007	0.010
Investment				
INSI1	0.5819 *** (9.8068)	0.1999 *** (4.1764)	0.1610 *** (6.2488)	0.0427 *** (3.3140)
INSI2	-0.1227 *** (-5.9451)	-0.0359 *** (-2.8025)	-0.0662 *** (-3.4413)	-0.2230 *** (-4.5889)
INSI3	0.0116 * (1.6396)	0.0146 (0.9220)	0.1194 *** (3.6655)	0.23E-02 (0.7800)
Q	0.1331 ** (2.9658)	0.0985 *** (3.1853)	0.1132 * (1.7574)	0.1499 *** (6.0369)
Firm size		0.0536 *** (13.7542)		0.0578 *** (14.3087)
Leverage		0.0160 *** (2.6121)		0.0237 *** (4.4003)
Liquidity		-0.2822 ** (-2.1447)		-0.1202 (-0.9229)
ROA		2.1354 (2.7754)		2.6945 *** (3.7928)
Adj.-R <sup>2</sup>	0.004	0.001	0.001	0.002

---

Ownership structure				
Investment	0.1997 *** (9.6001)	1.3841 ** (2.1439)	0.1247 *** (9.4343)	0.0339 (1.1379)
Q	3.1244 (0.8201)	0.0126 (0.4098)	0.4100 (0.6931)	0.1071 (0.7785)
Firm size		-0.44E-02 (-0.8973)		0.17E-02 (0.4210)
Leverage		-0.39E-02 (-0.6490)		-0.0108 * (-1.8351)
Liquidity		0.0489 *** (5.6822)		0.3830 *** (4.6977)
ROA		-0.0492 (-0.8002)		-0.7444 (-1.1177)
Adj.-R <sup>2</sup>	0.004	0.006	0.001	0.016

---

## References

- Agrawal, A. and Mandelker, G.N. (1987): "Managerial incentives and corporate investment and financing decisions". *Journal of Finance*. vol. 42, no. 4, pp. 823-837
- Agrawal, A. and Nagarajan, N.J. (1990): "Corporate capital structure, agency costs and owner-control: the case of all equity firms". *Journal of Finance*. vol. 45, no. 4, pp. 1325-1331.
- Allen, F. and Gale, D. (1994): "A welfare comparison of the German and U.S. financial systems". Working Paper, CEPR-BBV.
- Andrés, P.; Azofra, V. and Rodríguez, J.A. (2000): "Endeduamiento, oportunidades de crecimiento and estructura contractual: un contraste empírico para el caso español". *Investigaciones Económicas*. vol. 24, no. 3, pp. 641-679
- Ang, J.S.; Cole, R.A. and Wuh Lin, J. (2000): "Agency costs and ownership structure". *Journal of Finance*. vol. 55, no. 1, pp. 81-106.
- Becht, M and Röell, A. (1999): "Blockholdings in Europe". *European Economic Review*. vol. 43, no. 4-6, pp. 1049-1056.
- Berger, P. G. and Ofek, E. (1995): "Diversification's effect on the firm value", *Journal of Financial Economics*. vol. 37, pp. 39-65.
- Berglöf, E. (1990): *Corporate control and capital structure. Essays on property rights and financial contracts*. Institute of International Business. Stockholm.
- Bergström, C. and Rydqvist, K. (1990): "The determinants of corporate ownership". *Journal of Banking and Finance*. vol. 14, pp. 237-262.
- Blundell, R., Bond, S., Devereux, M. and Schiantarelli, F. (1992): "Investment and Tobin's q. Evidence from company panel data". *Journal of Econometrics*. vol. 51, n°1-2, pág. 233-257.
- Burkart, M.; Gromb, D. and Panunzi, F. (1997): "Large shareholders monitoring, and the value of the firm". *Quarterly Journal of Economics*. vol. 112, pp. 693-728.
- Calem, P. S. and Rizzo, J. A. (1995): "Financing constraints and investment: new evidence from hospital industry data". *Journal of Money, Credit and Banking*. vol. 27, no. 4, pp. 1002-1014.
- Calomiris, C. W. and Hubbard, R. G. (1995): "Internal finance and investment: evidence from the undistributed profits tax of 1936-37". *Journal of Business*. vol. 68, no. 4, pp. 443-482.
- Calomiris, C. W., Orphanides, A. and Sharpe, S. A. (1994): "Leverage as a state variable for employment, inventory accumulation, and fixed investment". *NBER Working Paper no. 4800*.
- Chen, C.R. and Steiner, T.L. (1999): "Managerial ownership and agency conflicts: A nonlinear simultaneous equation analysis of managerial ownership, risk taking, debt policy, and dividend policy". *Financial Review*. no. 34, pp. 119-136
- Cho, M.H. (1998): "Ownership structure, investment, and the corporate value: an empirical analysis". *Journal of Financial Economics*. vol. 47, pp. 103-121.
- Chung, K.H. and Pruitt, S.W. (1994): "A simple approximation of Tobin's q". *Financial Management*. vol. 23, pp. 70-74
- Demsetz, H. and Lehn, K. (1985): "The structure of corporate ownership: causes and consequences". *Journal of Political Economy*. vol. 93, no. 6, pp. 1155-1177
- Devereux, M and Schiantarelli, F. (1990): "Investment, financial factors, and cash flow: evidence from U.K. panel data". R. G. Hubbard (Ed.): *Asymmetric information, corporate finance and investment*. The University of Chicago Press. Chicago. pp. 279-306.
- Espitia, M. and Salas, V. (1986a): "Valoración de activos and coste del capital en la empresa española no financiera". *Revista Española de Economía*. vol. 3, no. 2, pp. 249-286.

- Esteve, V. and Tamarit, C. R. (1994): "Inversión agregada,  $q$  de Tobin and capacidad instalada. Una nota empírica". *Economía Industrial*. vol. 298, pp. 145-150.
- Fazzari, S. M., Hubbard, R. G. and Petersen, B. C. (1988): "Financing constraints and corporate investment". *Brooking Papers on Economic Activity*. vol. 1, pp. 141-195.
- Gaver, J.J. and Gaver, K.M. (1993): "Additional evidence on the association between the investment opportunity set and corporate financing, dividend and compensation policies". *Journal of Accounting and Economics*. vol. 16, pp. 125-160.
- Gul, F.A. (1999): "Growth opportunities, capital structure and dividend policies in Japan". *Journal of Corporate Finance*. vol. 5, pp. 141-168.
- Hadlock, C.J. (1998): "Ownership, liquidity, and investment". *RAND Journal of Economics*. vol. 29, no. 3, pp. 487-508.
- Harris, M. and Raviv, A. (1988): "Corporate control contests and capital structure". *Journal of Financial Economics*. vol. 20, pp. 55-86.
- Himmelberg, C.P.; Hubbard, R.G. and Palia, D. (1999): "Understanding the determinants of managerial ownership and the link between ownership and performance". NBER *Working paper*, no. 7209.
- Hoshi, T., Kashyap, A. and Scharfstein, D. (1990a): "The role of banks in reducing the costs of financial distress in Japan". *Journal of Financial Economics*. vol. 27, no.1, pp. 67-88.
- Hoshi, T., Kashyap, A. and Scharfstein, D. (1990b): "Bank monitoring and investment: evidence from the changing structure of Japanese corporate banking relationships". R. G. Hubbard (Ed.): *Asymmetric information, corporate finance and investment*. The University of Chicago Press. Chicago, pp. 105-126.
- Hoshi, T., Kashyap, A. and Scharfstein, D. (1991): "Corporate structure, liquidity and investment: evidence from Japanese industrial groups". *Quarterly Journal of Economics*. vol. 106, no.1, pp. 33-60.
- Jensen, M. C. (1986): "Agency costs of free cash flow, corporate finance, and takeovers". *American Economic Review*. vol. 76, pp. 323-329.
- Jensen, M. C. and Meckling, W. H. (1976): "Theory of the firm: managerial behavior, agency costs and ownership structure". *Journal of Financial Economics*. vol. 3, no. 4, pp. 305-360.
- Kaplan, S. N. and Zingales, L. (1995): "Do financing constraints explain why investment is correlated with cash flow?" NBER Working Paper no. 5267
- Kole, S. (1994): "Managerial ownership and firm performance: incentives or rewards? Working paper 93-10. University of Rochester.
- La Porta, R.; López de Silanes, F. and Shleifer, A. (1999): "Corporate ownership around the world". *Journal of Finance*. vol. 54, no. 2, pp. 471-517.
- Lang, L. and Stulz, R.M. (1994): "Tobin's  $q$ , corporate diversification, and firm performance". *Journal of Political Economy*. vol. 102, no. 6, pp. 1248-1280.
- Lang, L., Ofek, E. and Stulz, R. M. (1995): "Leverage, investment, and firm growth". *Journal of Financial Economics*. no. 40, pp. 3-29.
- Lange, H. P. and Sharpe, I. G. (1995): "Monitoring costs and ownership concentration: Australian evidence". *Applied Financial Economics*. vol. 5, pp. 441-447.
- Leland, H.E. and Pyle, D.H. (1977): "Informational asymmetries, financial structure and financial intermediation". *Journal of Finance*. vol. 32, no.2, pp. 371-387.
- Linderberger, E.B. and Ross, S.A. (1981): "Tobin's  $Q$  ratio and industrial organization". *Journal of Business*. vol. 54, pp. 1-32.

- Mátyás, L. and Sevestre, P. (1992): *The econometrics of panel data*. Kluwer Academic Publishers. Dordrecht.
- McConnell, J. and Muscarella, C. (1985): "Corporate capital expenditure decisions and the market value of the firm". *Journal of Financial Economics*. vol. 14, pp. 399-422.
- McConnell, J.J. and Servaes, H. (1990): "Additional evidence on equity ownership and corporate value". *Journal of Financial Economics*. vol. 27, pp. 595-612.
- Menéndez Requejo, S. (1996): "Interdependencia de las decisiones financieras en las empresas españolas". *Revista Española de Financiación y Contabilidad*. vol. 25, no. 87. pp. 315-342.
- Morck, R.; Shleifer, A. and Vishny, R.W. (1989): "Management ownership and market valuation. An empirical analysis". *Journal of Financial Economics*. vol. 20, pp. 293-315.
- Murphy, K. (1985): "Corporate performance and managerial remuneration". *Journal of Accounting and Economics*. vol. 7, pp. 11-42.
- Noronha, G.M.; Shome, D.K. and Morgan, G.E. (1996): "The monitoring rationale for dividends and the interaction of capital structure and dividend decisions". *Journal of Banking & Finance*. vol. 20, pp. 439-454.
- Prowse, S. (1994): "Corporate governance in an international perspective". *BIS Economic Papers*. no. 41, July.
- Ramirez, C. D. (1995): "Did J.P. Morgan's men add liquidity? Corporate investment, cash flow, and financial structure at the turn of the twentieth century". *Journal of Finance*. vol. 50, no. 2, pp. 661-678.
- Schaller, H. (1993): "Asymmetric information, liquidity constraints and Canadian investment". *Canadian Journal of Economics*. vol. 26, no. 3, pp. 552-574.
- Smith, C. W. and Watts, R. (1992): "The investment opportunity set and corporate financing, dividend, and compensation policies". *Journal of Financial Economics*. vol. 32, pp. 263-292.
- Stulz, R. (1988): "Managerial control of voting rights: Financial policies and the market for corporate control". *Journal of Financial Economics*. vol. 20, pp. 25-54.
- Thomsen, S. and Pedersen, T. (2000): "Ownership structure and economic performance in the largest European companies". *Strategic Management Journal*. vol. 21, pp. 689-705.