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# Effect of ownership structure on underinvestment and overinvestment: empirical evidence from Spain

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**Abstract**

This paper investigates how ownership affects the investment-cash flow sensitivity by taking into account the non-linearities of ownership with respect to firm value, and using a free cash flow index and a criterion for financial constraints to disentangle underinvestment and overinvestment. Interesting results are provided by estimating using the Generalized Method of Moments to eliminate the endogeneity problem. The alignment of interests between owners and managers and the monitoring by concentrated ownership both alleviate the sensitivity of investment to cash flow both in underinvestor and overinvestor firms. However, in the presence of controlling owners, underinvestment and overinvestment are exacerbated.

*Key words*: Underinvestment; Overinvestment; Managerial entrenchment; Expropriation

*JEL classification*: G31, G32

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## 1. Introduction

As demonstrated by Modigliani and Miller (1958), in perfect capital markets, a firm's investment decisions are independent of its financial structure. However, capital markets are not perfect and it is now generally accepted that a firm's

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investment depends on financial factors, such as internal cash flow. The observed sensitivity of investment to cash flow has given rise to extensive research based on the fact that capital markets are not perfect and, consequently, that external capital does not provide a perfect substitute for internal funds. One of the most striking consequences of market imperfections are distortions in firms' investment decisions. In fact, the conflicts of interests between the main stakeholder groups (i.e. shareholders, bondholders and managers) might lead firms to invest above or below their optimal levels. In particular, as pointed out by Thakor (1993), when the decision-makers act in their own best interests two well-known inefficiencies may occur: underinvestment and overinvestment.

Nevertheless, it could be the case that investment inefficiencies bring private benefits to certain stakeholders despite the collective costs of this deviation from the value-maximization rule. Given this argument, we assume that a firm's controlling owners,[1] being the decision-makers, are the stakeholders who derive the benefits from inefficient investment decisions in the firm. Consequently, the following question arises: may underinvestment and overinvestment be caused to some extent, or at least promoted, by a firm's controlling owners? In other words, might controlling owners support non-optimal levels of investment to further their own interests? This paper tries to shed light on this question by analysing the role played by a firm's ownership structure and, more precisely, by a firm's controlling owners in the corporate investment decision.

The financial literature widely supports the idea that ownership structure is one of the main corporate governance mechanisms that influences the scope of a firm's agency costs, especially those that are generated by the various conflicts of interest characterizing the relationships among agents in imperfect capital markets (Jensen and Meckling, 1976). It is to be expected that both insider ownership and ownership concentration will affect the investment decision, precisely because of this link between a firm's ownership structure and the extent and consequences of its agency problems.

However, to date, few papers have investigated how ownership structure influences the sensitivity of investment to cash flow. Oliner and Rudebusch (1992) were among the first to account for the role played by a firm's ownership structure in its preference for financing investment with internal funds, but did not find evidence of any effect. In contrast, Goergen and Renneboog's (2001) results show that ownership structure does play a role in the dependence of investment on cash flow. However, Goergen and Renneboog (2001) do not attempt to account for the widely supported non-linearities of the value-ownership relation and, consequently, they do not control for the phenomena of entrenchment and expropriation that are associated with certain levels of insider ownership and ownership concentration. This limitation is partially overcome

[1] Our concept of controlling owner refers not only to large outside shareholders, but also to managers who own shares.

by Hadlock (1998), who examines how insider ownership affects the sensitivity of investment to cash flow depending on whether there is convergence of interests or managerial entrenchment. Moreover, in Hadlock's study, the underinvestment and overinvestment processes are considered to be mutually exclusive interpretations of the sensitivity of investment to cash flow. However, there is empirical evidence to support the idea that sensitivity of investment to cash flow can manifest itself in both underinvestment and overinvestment, depending on the different features of the firm.[2] More recently, Pawlina and Renneboog (2005) integrate the monitoring effect of outside blockholders in their analysis of the sensitivity of investment to cash flow of UK firms. They find evidence of a non-linear effect of insider ownership on the sensitivity of investment to cash flow, which is consistent with the alignment of interest and managerial entrenchment hypotheses on insiders. They also found that the presence of large outside blockholders reduces the sensitivity of investment to cash flow, which is consistent with the monitoring hypothesis on outsiders. Finally, Degryse and de Jong (2006) investigate the investment-cash flow sensitivity in the Netherlands by distinguishing between firms with underinvestment problems and firms with overinvestment problems. Their results show that the overinvestment problem is more important than the underinvestment problem.

Given the state of knowledge, our study contributes to the literature in a number of ways. First, we offer an analysis of how insider ownership and ownership concentration influence the sensitivity of investment to cash flow in Spanish firms. The interest in studying Spain stems from it being a civil law country and, according to La Porta *et al*. (1998), the protection of Spanish investors is weaker than that of their common law counterparts. Specifically, the weaker protection that Spanish minority shareholders enjoy might lead firms to rely more heavily on internal funds to finance investment, given the difficulty and the relatively higher cost of equity they would bear as compared to firms in common law countries (namely, the USA, UK and Australia). Within this setting, higher sensitivity of investment to cash flow should be expected. Furthermore, as La Porta *et al*. (1999) point out, the risk of expropriation of minority shareholders is greater in countries that offer weaker protection to investors.[3] Accordingly, we integrate not only managerial entrenchment, but also expropriation, into the analysis to learn how these phenomena influence underinvestment and overinvestment. Second, we differentiate firms according to their propensity to suffer from underinvestment or overinvestment by using a free cash flow index, as well as a criterion for financial constraints. Therefore, the approach we propose here allows us to learn whether ownership structure plays a different role in sensitivity of

[2] See, for instance, Hoshi *et al*. (1991), Vogt (1994, 1997), Miguel and Pindado (2001), Morgado and Pindado (2003) and Hovakimian and Hovakimian (2009).

[3] Actually, this is the case in Spain, where controlling owners manage to expropriate rents from minority ones, as documented in Miguel *et al*. (2004).

investment to cash flow in each of these two alternative scenarios, and whether managerial entrenchment and expropriation cause a shift in the role played by ownership structure in this sensitivity. Finally, we address the endogeneity problem that arises in our analysis by adopting an approach that uses instrumental variables. Specifically, we estimate our models by using the generalized method of moments (GMM), which, unlike within-groups or generalized least squares estimators, mitigates the endogeneity problem by using instruments.

Our results yield two major conclusions. First, investment is sensitive to cash flow and this sensitivity is influenced strongly by corporate ownership. We find that, in general, the alignment of interests between owners and managers as well as the monitoring by concentrated ownership both alleviate the sensitivity of investment to cash flow. However, ownership is not so helpful in controlling investment distortions when higher stakes allow managers to become entrenched, and majority owners to expropriate the wealth of minority shareholders. In fact, it seems that controlling owners support non-optimal levels of investment to further their own interests, because, in their presence, investment becomes more sensitive to cash flow and, consequently, underinvestment and overinvestment are exacerbated. Second, the convergence of interests between owners and managers proves to be more helpful in avoiding overinvestment problems, whereas the monitoring of managers by large shareholders is more useful in firms suffering from underinvestment problems. Finally, the results for financially constrained firms reveal that aligning the interests of owners and managers and monitoring managerial activity translate into higher underinvestment in these firms.

The remainder of this paper is organized as follows. In Section 2, we describe our empirical approach and present the models and hypotheses. In Section 3, we describe the dataset and the estimation method. In Section 4, we discuss the results. Section 5 concludes.

## 2. Empirical models and hypotheses

Following the pioneering work by Fazzari *et al*. (1988), many subsequent studies have confirmed empirically that a firm's cash flow affects its investment spending. As a consequence, neoclassical models had to be reformulated in order to take into account the effects of a firm's financial situation on investment. One of the most widely accepted empirical models is that of Fazzari *et al*. (1988), who extend the well-known Q model of investment by incorporating cash flow as follows:

$$(I/K)_{it} = f(CF/K)_{it} + g(X/K)_{it} + u_{it},$$

where $I_{it}$ denotes the investment in plant and equipment for firm $i$ during the period $t$, $g$ is a function that depends on the firm's internal cash flow ($CF_{it}$), $X_{it}$ is a vector of variables that includes other potential determinants of investment according to financial theory, and $u_{it}$ is the error term.

Note that function *f* represents the potential sensitivity of investment to fluctuations in cash flow, whereas function *g* controls for such sensitivity through the variables in *X*. In this way, this specification allows us to integrate the ownership structure into the analysis of the sensitivity of investment to cash flow by extending function *f*. This extension consists of allowing the cash flow variable to interact with a dummy variable that accounts for the ownership structure.

The financial literature widely supports the contention that ownership structure has a non-linear influence on the scope of the firm's agency problems and, therefore, is related non-linearly to firm value.[4]

We address the issue of how insider ownership and ownership concentration influence the sensitivity of investment to cash flow by explicitly taking into account the non-linearities of ownership structure with respect to firm value. To achieve this aim, we expand on the results in Miguel *et al*. (2004), who find that Spanish insiders become entrenched when their ownership lies within the 35 to 70 per cent range and that here is expropriation of Spanish minority shareholders when the level of ownership concentration increases beyond 87 per cent.[5]

In accordance with the breakpoints found in the value-ownership relation, we defined two dummy variables that allow us to control for non-linearities. Specifically, the insider ownership dummy (*IOD*) takes the value 1 when there is a convergence of interests between managers and shareholders (i.e. when the level of insider ownership is below 35 per cent or above 70 per cent), and 0 otherwise (i.e. when managers become entrenched).[6] The value of the ownership concentration dummy (*OCD*) is 1 when there is monitoring by large shareholders (i.e. when ownership concentration is below 87 per cent), and 0 otherwise (i.e. when controlling owners manage to expropriate the wealth of minority owners).[7]

In this way, we integrate non-linearities of ownership structure with respect to firm value into the analysis of the sensitivity of investment to cash flow by entering the interaction terms of these ownership dummies with the cash flow variable, in addition to the standalone cash flow variable, in the investment model. Moreover, our model, within the q-theory framework, controls for investment opportunities through Tobin's q, and for firm size. Following Fazzari *et al*. (1988), the two equations below are used to investigate how insider

[4] This non-linearity applies to both insider ownership, as a consequence of the convergence of interest and entrenchment (see, for instance, Morck *et al*., 1988; Miguel *et al*., 2004), and ownership concentration, as a result of the monitoring and expropriation (see, for instance, Gedajlovic and Shapiro, 1998; Miguel *et al*., 2004).

[5] More details of this procedure can be found in Miguel *et al*. (2004).

[6] Insider ownership is the total percentage of common shares held by board members. A similar definition of insider ownership can be found in, for instance, Morck *et al*. (1988).

[7] Ownership concentration is measured as the total percentage of common shares held by shareholders that own 5 per cent or more of the firm's equity.

ownership and ownership concentration influence the sensitivity of investment to cash flow:

$$(I/K)_{it} = \beta_0 + (\beta_1 + \beta_2 IOD_{it})(CF/K)_{it} + \beta_3 Q_{it} + \beta_4 SI_{it} + d_t + \eta_i + v_{it}, \quad (1)$$

$$(I/K)_{it} = \alpha_0 + (\alpha_1 + \alpha_2 OCD_{it})(CF/K)_{it} + \alpha_3 Q_{it} + \alpha_4 SI_{it} + d_t + \eta_i + v_{it}, \quad (2)$$

where $I_{it}$, $CF_{it}$, $Q_{it}$ and $SI_{it}$ denote investment, cash flow, Tobin's q, and size, respectively.[8] Following Miguel and Pindado (2001), we measure investment as $I_{it} = NF_{it} - NF_{it-1} + BD_{it}$, where $NF_{it}$ denotes net fixed assets and $BD_{it}$ is the book depreciation expense. Cash flow is computed as $CF_{it} = NI_{it} + BD_{it}$, where $NI_{it}$ denotes net income. Tobin's q is calculated as $Q_{it} = \dfrac{V_{it} + MVLTD_{it} + BVSTD_{it}}{K_{it}}$, where $V_{it}$ is the market value of equity, $MVLTD_{it}$ is the market value of the long-term debt (calculated as in Miguel and Pindado, 2001), and $BVSTD_{it}$ is the book value of the short-term debt. Size is the logarithm of the replacement value of total assets, $K_{it}$, calculated as in Miguel and Pindado (2001). Investment and cash flow are scaled by the replacement value of total assets to avoid heteroscedacity.

In equation (1), $(\beta_1 + \beta_2)$ and $\beta_1$ represent the sensitivity of investment to cash flow when there is convergence of interests (i.e. when $IOD_{it}$ takes the value 1) and managerial entrenchment (i.e. when $IOD_{it}$ takes the value 0), respectively. In the same way, $(\alpha_1 + \alpha_2)$ and $\alpha_1$ in equation (2) represent this sensitivity when there is monitoring by large shareholders (i.e. when $OCD_{it}$ takes the value 1) and expropriation (i.e. when $OCD_{it}$ takes the value 0), respectively. To check the statistical significance of these coefficients when the dummy variable takes the value 1, we performed linear restriction tests. For example, in equation (1) the null hypothesis tested is $H_0$: $\beta_1 + \beta_2 = 0$.

Once non-linearities of ownership structure have been controlled for, another issue referring to the source of sensitivity of investment to cash flow must be addressed. In fact, the widely documented dependence of investment on internal funds can be attributed to the existence of both investment distortions: underinvestment and overinvestment.

Underinvestment is caused by conflicts between the main stakeholder groups which give rise to several well-known problems: the asset substitution (Jensen and Meckling, 1976) and the moral hazard problems (Myers, 1977) arising from the conflict between shareholders and bondholders; and the adverse selection problems deriving from the conflict between bondholders and shareholders (Stiglitz and Weiss, 1981), as well as between current and prospective shareholders (Myers and Majluf, 1984).

[8] The subscript $i$ refers to the company and $t$ refers to the time period. $d_t$ is a time-specific effect, $\eta_i$ is a firm-specific effect, and $v_{it}$ is the random disturbance.

Each of these problems creates a cost disadvantage of external finance that might give rise to financing constraints and that, consequently, might lead firms to forego positive net present value projects when there are no internal funds available. This underinvestment is the most widely accepted interpretation of the sensitivity of investment to cash flow. Fazzari *et al*. (1988), Allayannis and Mozumdar (2004) and Moyen (2004), among many others, have presented empirical confirmation of a strong positive relationship between the level of investment and the availability of internal funds, and they all interpret this sensitivity of investment to cash flow in terms of underinvestment caused by financing constraints in capital markets.[9]

Alternatively, overinvestment that arises from the misalignment of the interests of owners and managers might also explain the sensitivity of investment to cash flow. When ownership and control are separated, managers have great discretion in the decision-making process and, rather than paying out dividends to shareholders, they prefer to use cash flow to maximize their personal wealth. Consequently, as pointed out by Jensen (1986), managers have incentives to use the firm's free cash flow to undertake negative net present value projects, which would not happen if they had to raise external capital at a higher cost. It is worthwhile noting that, despite the difficulties in finding good proxies for free cash flow, this hypothesis of overinvestment has been confirmed empirically from different perspectives by, for instance, Lang *et al*. (1996), Lamont (1997), Chen and Ho (1997), Del Brio *et al*. (2003a,b) and Aivazian *et al*. (2005).

Although most studies on the sensitivity of investment to cash flow support only one of its two alternative interpretations, there is empirical evidence to indicate that both underinvestment and overinvestment can be sources of the phenomenon, depending on the different features of the firm (see references in footnote 2).

We go further on this matter and account for the two following issues. First, underinvestment and overinvestment might not be mutually exclusive. Second, and more interestingly, ownership might play a different role in the sensitivity of investment to cash flow depending on the investment inefficiency suffered by the firm: the rejection of positive net present value projects because of the lack of internal funds to finance them, or the use of free cash flow to undertake negative net present value projects. We now discuss these different roles and pose our hypotheses.[10]

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[9] However, this interpretation of the sensitivity of investment to cash flow has been questioned by Kaplan and Zingales (1997), Cleary (1999, 2006) and Chang *et al*. (2007), among others. Contrary to most evidence, these studies find that the investment of firms that are the most financially constrained is the least sensitive to cash flow.

[10] Table 1 summarizes our hypotheses and relates them to the expected coefficients of cash flow in our models.

Table 1
Hypotheses to be tested and implications for coefficients to be interpreted

| Implications for investment | Hypothesis | Ownership effect | Subgroup | CF coefficient | Implications for CF coefficients |
|---|---|---|---|---|---|
| Aligning the interest of owners and managers leads investment to be less sensitive to cash | H1a | Alignment of interests = lower underinvestment (i.e. lower ICFS) | $IOD_{it} = 1$ $SSD_{it} = 0$ | $\beta_1 + \beta_2$ | $\beta_1 + \beta_2 < \beta_1$ |
| | | Managerial entrenchment = higher underinvestment (i.e. greater ICFS) | $IOD_{it} = 0$ $SSD_{it} = 0$ | $\beta_1$ | |
| | | Alignment of interests = lower overinvestment (i.e. lower ICFS) | $OCD_{it} = 1$ $SSD_{it} = 0$ | $\beta_1 + \beta_2 + \beta_3 + \beta_4$ | $\beta_1 + \beta_2 + \beta_3 + \beta_4 < \beta_1 + \beta_3$ |
| | | Managerial entrenchment = higher overinvestment (i.e. greater ICFS) | $OCD_{it} = 0$ $SSD_{it} = 0$ | $\beta_1 + \beta_3$ | |
| Monitoring by large outside owners leads investment to be less sensitive to cash | H1b | Monitoring = lower underinvestment (i.e. lower ICFS) | $IOD_{it} = 1$ $SSD_{it} = 1$ | $\alpha_1 + \alpha_2$ | $\alpha_1 + \alpha_2 < \alpha_1$ |
| | | Expropriation = higher underinvestment (i.e. greater ICFS) | $IOD_{it} = 0$ $SSD_{it} = 1$ | $\alpha_1$ | |
| | | Monitoring = lower overinvestment (i.e. lower ICFS) | $OCD_{it} = 1$ $SSD_{it} = 1$ | $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4$ | $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 < \alpha_1 + \alpha_3$ |
| | | Expropriation = higher overinvestment (i.e. greater ICFS) | $OCD_{it} = 0$ $SSD_{it} = 1$ | $\alpha_1 + \alpha_3$ | |
| The alignment of interests is more useful in mitigating overinvestment problems | H2a | Alignment = ICFS reduction more pronounced in overinvestor firms | $SSD_{it} = 0$ | $\beta_1 + \beta_2$ if $IOD_{it} = 1$<br>$\beta_1$ if $IOD_{it} = 0$ | $\beta_1 - (\beta_1 + \beta_2) < (\beta_1 + \beta_3) - (\beta_1 + \beta_2 + \beta_3 + \beta_4)$ |
| | | | $SSD_{it} = 1$ | $\beta_1 + \beta_2 + \beta_3 + \beta_4$ if $IOD_{it} = 1$<br>$\beta_1 + \beta_3$ if $IOD_{it} = 0$ | |
| The monitoring is more useful in mitigating overinvestment problems | H2b | Monitoring = ICFS reduction more pronounced in overinvestor firms | $SSD_{it} = 0$ | $\alpha_1 + \alpha_2$ if $OCD_{it} = 1$<br>$\alpha_1$ if $OCD_{it} = 0$ | $\alpha_1 - (\alpha_1 + \alpha_2) < (\alpha_1 + \alpha_3) - (\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4)$ |
| | | | $SSD_{it} = 1$ | $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4$ if $OCD_{it} = 1$<br>$\alpha_1 + \alpha_3$ if $OCD_{it} = 0$ | |

This table summarizes the hypotheses to be tested in this paper, and relates them to the expected coefficients of cash flow in models (3) and (4):

Model (3): $(I/K)_{it} = \beta_0 + \beta_1 + \beta_2 IOD_{it} + \beta_3 FCD_{it} + \beta_4 IOD_{it} x FCD_{it})(CF/K)_{it} + \beta_5 Q_{it} + \beta_6 SI_{it} + d_t + \eta_i + \nu_{it}$,

Model (4): $(I/K)_{it} = \alpha_0 + \alpha_1 + \alpha_2 OCD_{it} + \alpha_3 SSD_{it} + \alpha_4 OCD_{it} x SSD_{it})(CF/K)_{it} + \alpha_5 Q_{it} + \alpha_6 SI_{it} + d_t + \eta_i + \nu_{it}$.

CF denotes cash flow, and ICFS stands for sensitivity of investment to cash flow.

On the one hand, the arguments pointing to ownership structure as one of the most important mechanisms for mitigating agency conflicts suggest that insider ownership and ownership concentration lessen the dependence of investment on internal finance and, consequently, lower underinvestment and overinvestment. That is, the more aligned the interests of insiders and the more efficient the monitoring by outside owners, the more likely the fulfilment of the value-maximization rule, and the lower the risk that underinvestment and overinvestment occur. However, entrenched managers and controlling owners who are able to expropriate rents will probably pursue their own best interests far from value maximization. In these cases, investment efficiency might turn into a secondary aim, and underinvestment and overinvestment would increase. In accordance with this reasoning, we frame the following hypotheses:

*$H_{1a}$: The sensitivity of investment to cash flow is lower when there is a convergence of interests between owners and managers as compared to that under managerial entrenchment.*

*$H_{1b}$: The sensitivity of investment to cash flow is lower when there is monitoring by concentrated ownership as compared to that under expropriation.*

On the other hand, the role played by corporate ownership in mitigating agency conflicts is especially important in what refers to the conflict between owners and managers. First, according to Jensen and Meckling (1976), managers' natural tendency is to make decisions in their own best interests; however, as insider equity ownership increases, the conflicts between managers and shareholders are likely to be resolved (Jensen and Meckling, 1976). Second, since dispersion creates free-riding problems and makes manager monitoring difficult, a concentrated ownership is considered to reduce the scope of managerial opportunism and mitigate the owner–manager conflict (Shleifer and Vishny, 1986). On the basis of these arguments, we expect corporate ownership to lessen the investment-cash flow sensitivity to a larger extent when this sensitivity is the result of the conflict between owners and managers. Consequently, insider ownership and ownership concentration are clearer solutions to the overinvestment than to the underinvestment problems.

*$H_{2a}$: The role of alignment of interests in mitigating the sensitivity of investment to cash flow is more pronounced for overinvestor firms.*

*$H_{2b}$: The role of monitoring in mitigating the sensitivity of investment to cash flow is more pronounced for overinvestor firms.*

To test these hypotheses, we designed a classification scheme that allows us to distinguish between firms according to their propensity to underinvest or overinvest. Following Miguel and Pindado (2001), we constructed a free cash flow index (defined as the interaction between the firm's cash flow and the

inverse of its investment opportunities[11]) in order to identify two groups of firms: firms with a low free cash flow index are considered to be underinvestor firms, and firms with a high free cash flow index are considered to be overinvestor firms. In this way, we defined a sample selection dummy variable ($SSD_{it}$), which is 1 when the firm's free cash flow index is higher than the sample mean, and 0 otherwise.[12] We then allowed this dummy to interact with the cash flow variable, as well as with the interaction of the ownership dummies with cash flow, and obtained the following investment equations:

$$(I/K)_{it} = \beta_0 + (\beta_1 + \beta_2 IOD_{it} + \beta_3 SSD_{it} + \beta_4 IOD_{it}\, xSSD_{it})\,(CF/K)_{it} + \beta_5 Q_{it} + \beta_6 SI_{it} + d_t + \eta_i + v_{it}, \quad (3)$$

$$(I/K)_{it} = \alpha_0 + (\alpha_1 + \alpha_2 OCD_{it} + \alpha_3 SSD_{it} + \alpha_4 OCD_{it}\, xSSD_{it})\,(CF/K)_{it} + \alpha_5 Q_{it} + \alpha_6 SI_{it} + d_t + \eta_i + v_{it}. \quad (4)$$

Therefore, in equation (3), $(\beta_1 + \beta_2)$ and $\beta_1$ represent the sensitivity of investment to cash flow of underinvestor firms under convergence of interests (i.e. when $IOD_{it}$ takes the value one and $SSD_{it}$ takes the value 0) and under entrenchment (i.e. when $IOD_{it}$ and $SSD_{it}$ take the value 0), respectively. Similarly, the investment-cash flow sensitivity of overinvestor firms is $(\beta_1 + \beta_2 + \beta_3 + \beta_4)$ under convergence of interests (i.e. when $IOD_{it}$ and $SSD_{it}$ take the value 1), and $(\beta_1 + \beta_3)$ under entrenchment (i.e. when $IOD_{it}$ takes the value 0 and $SSD_{it}$ takes the value 1).[13] In these models, we also have to check the statistical significance of the coefficient on the cash flow variable whenever one or both of the two dummies take the value 1.

This classification scheme, which is based on the firm's free cash flow, accurately fits Jensen's (1986) definition of overinvestor firms, but it might not be as precise as that when identifying those firms that underinvest. In fact, the lack of cash flow to finance all profitable projects does not itself entail underinvestment unless financial constraints in capital markets make it difficult, or even impossible, for firms to access external capital. Given this, we classified our sample firms according to their financial status in order to identify which ones face a

[11] This index is consistent with Jensen's (1986) definition of free cash flow as cash flow that is not consumed by investment opportunities. Note that if a firm has a high level of cash flow and a low level of investment opportunities, the free cash flow index will take a high value, which indicates that the firm suffers from severe free cash flow problems; and vice versa if the level of cash flow is low and the level of investment opportunities is high.

[12] In the same vein, Florackis and Ozkan (2009) consider simultaneously a firm's market-to-book and cash holdings ratios to define a dummy variable that identifies firms that are potential overinvestors.

[13] A similar interpretation applies to the coefficients of the cash flow variable in equation (4).

real threat of underinvestment. Following a slightly modified version of the criterion used by Bond and Meghir (1994), dividends and new equity issues both dated $t-1$ were used to split the sample. Specifically, only those firms that pay dividends below the sample mean and that do not issue new shares in $t-1$ are considered to be constrained by the availability of internal finance. In this way, we defined a financial constraint dummy variable ($FCD_{it}$) which is 1 when the firm is not financially constrained, and 0 otherwise. We then replaced $SSD_{it}$ with $FCD_{it}$ in equations (3) and (4) in order to check the robustness of our results.

## 3. Data and methodology

To achieve our aim, we used the same sample of Spanish companies as in Miguel *et al*. (2004). Consequently, our principal source of information was the CNMV (Spanish Security Exchange Commission). Specifically, balance sheet and ownership data were collected in the form of 'Interim Financial Reports for all quoted companies' and 'Significant shares for all quoted companies', respectively. Data on the market value of the company shares were extracted from the Daily Bulletin of the Madrid Stock Exchange.

We constructed an unbalanced panel data of 135 non-financial quoted Spanish firms (1233 observations) from 1990 to 1999. The information for all these firms was available for at least six consecutive years between 1990 and 1999. This was a necessary condition for testing for second-order serial correlation, as Arellano and Bond (1991) point out.

Summary statistics (mean, standard deviation, minimum and maximum) of the variables used in the estimation are given in Table 2. It is worth noting that, on average, significant Spanish shareholders own more than 60 per cent of their firms' capital, which is to be expected in a governance system with concentrated

Table 2
Summary statistics

| | Mean | Median | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| $(I/K)_{it}$ | 0.0149 | 0.0118 | 0.1456 | −1.544 | 0.7855 |
| $(CF/K)_{it}$ | 0.0465 | 0.0429 | 0.0703 | −0.4372 | 0.6135 |
| $IO_{it}$ | 0.1766 | 0.0411 | 0.2382 | 0.0000 | 1.0000 |
| $OC_{it}$ | 0.6431 | 0.6511 | 0.2415 | 0.0001 | 1.0000 |
| $Q_{it}$ | 1.1470 | 0.9534 | 0.8505 | 0.2067 | 13.7740 |
| $SI_{it}$ | 10.5820 | 10.4320 | 1.6000 | 6.3720 | 15.9330 |
| $FCF_{it}$ | 0.0433 | 0.0426 | 0.0784 | −0.6845 | 0.8487 |

$(I/K)_{it}$ denotes investment, $(CF/K)_{it}$ is the cash flow, $IO_{it}$ and $OC_{it}$ denote insider ownership and ownership concentration, respectively, $Q_{it}$ is Tobin's q, $SI_{it}$ is the size and $FCF_{it}$ is the free cash flow. For each variable, we report the values of the following statistics: mean, median, standard deviation, minimum and maximum.

Table 3
Dummy variables

| | Number of observations in each category | | |
|---|---|---|---|
| $IOD_{it}$ | $IO_{it} < 35\%$ | $35\% < IO_{it} < 70\%$ | $IO_{it} > 70\%$ |
| | 871 | 185 | 42 |
| $OCD_{it}$ | $OC_{it} < 80.7\%$ | $OC_{it} > 80.7\%$ | |
| | 841 | 257 | |
| $SSD_{it}$ | $FCF_{it} < FCF_m$ | $FCF_{it} > FCF_m$ | |
| | 525 | 573 | |
| $FCD_{it}$ | $DIV_{it-1} < DIV_m$ and $\Delta SH_{it-1} = 0$ | $DIV_{it-1} > DIV_m$ and $\Delta SH_{it-1} > 0$ | |
| | 502 | 596 | |

$IOD_{it}$ and $OCD_{it}$ denote insider ownership and ownership concentration dummies, respectively, $SSD_{it}$ is the sample selection dummy and $FCD_{it}$ is the financial constraint dummy. The variables used to define these dummy variables are the following: $IO_{it}$ and $OC_{it}$ denote insider ownership and ownership concentration, respectively, $FCF_{it}$ and $FCF_m$ stand for the firm's and the sample mean free cash flow, respectively, $DIV_{it-1}$ and $DIV_m$ denote the firm's and the sample mean dividends, and $\Delta SH_{it-1}$ is the increment of shares. For each dummy category, we report the number of observations.

ownership such as the Spanish one.[14] The shares owned by insiders are only 17 per cent on average, which indicates that there is a separation between ownership and control and, consequently, that the agency arguments that were discussed in the Introduction apply in the Spanish corporate governance system. Information on the dummy variables used in the analysis is provided in Table 3, which reports the number of observations in each category depending on the turning points and value of the variables used in their construction.

The estimation method was selected in order to avoid unobservable heterogeneity and endogeneity. First, unlike cross-sectional analyses, panel data allow us to control for unobservable heterogeneity through an individual effect, $\eta_i$, and to eliminate the risk of obtaining biased results because of this heterogeneity. We took first differences of the variables in order to eliminate the individual effect specified in the models and then estimated the models thus obtained. Second, we estimated our models by using the generalized method of moments (GMM), which, unlike within-groups or generalized least squares estimators, accounts for endogeneity by using instruments. Following Arellano and Bond (1991), we used all the right-hand side variables in the models lagged twice or more as instruments in order to improve efficiency. Note that, as occurs in Florackis and Ozkan (2009), the endogeneity problem in our analysis might

[14] Significant shareholders are those who own 5 per cent or more of the capital. Note that in Spain, only stakes equal to or above 5 per cent must be disclosed publicly.

Table 4
Estimation for the full sample

$$(I/K)_{it} = \beta_0 + (\beta_1 + \beta_2 IOD_{it})(CF/K)_{it} + \beta_3 Q_{it} + \beta_4 SI_{it} + d_t + \eta_i + v_{it}, \quad (1)$$

$$(I/K)_{it} = \alpha_0 + (\alpha_1 + \alpha_2 OCD_{it})(CF/K)_{it} + \alpha_3 Q_{it} + \alpha_4 SI_{it} + d_t + \eta_i + v_{it}. \quad (2)$$

| | Equation (1) | Equation (2) |
|---|---|---|
| Constant | 0.009* (0.002) | 0.009* (0.004) |
| $(CF/K)_{it}$ | 0.511* (0.032) | 0.454* (0.027) |
| $IOD_{it}(CF/K)_{it}$ | –0.198* (0.04049) | |
| $OCD_{it}(CF/K)_{it}$ | | –0.165* (0.038) |
| $Q_{it}$ | 0.075* (0.002) | 0.074* (0.002) |
| $SI_{it}$ | 0.192* (0.004) | 0.187* (0.004) |
| $t_1$ | 14.33 | |
| $t_2$ | | 11.90 |
| $z_1$ | 3338.303 (4) | 1856.678 (4) |
| $z_2$ | 2214.113 (7) | 3009.367 (7) |
| $m_1$ | –3.753 | –3.802 |
| $m_2$ | –1.349 | –1.350 |
| Sargan | 110.541 (108) | 118.076 (108) |

The regressions are performed by using the panel described in Table 2. The rest of the information needed to read this table is as follows: (i) heteroscedacity consistent asymptotic standard error in parentheses; (ii) * indicates significance at the 1 per cent level; (iii) $t_1$ is the $t$-statistic for the linear restriction test under the null hypothesis $H_0$: $\beta_1 + \beta_2 = 0$; $t_2$ is the $t$-statistic for the linear restriction test under the null hypothesis $H_0$: $\alpha_1 + \alpha_2 = 0$; (iv) $z_1$ is a Wald test of the joint significance of the reported coefficients, asymptotically distributed as $\chi^2$ under the null of no relationship, degrees of freedom in parentheses; $z_2$ is a Wald test of the joint significance of the time dummies, asymptotically distributed as $\chi^2$ under the null of no relationship, degrees of freedom in parentheses; (v) $m_i$ is a serial correlation test of order $i$ using residuals in first differences, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation; and (vi) Sargan is a test of the overidentifying restrictions, asymptotically distributed as $\chi^2$ under the null, degrees of freedom in parentheses.

arise for several reasons. First, there are characteristics that influence both the dependent and the explanatory variables in our models that are difficult to measure or hard to obtain. Second, it is possible that some of the explanatory variables might be correlated with the past and current values of the idiosyncratic component of disturbances. Third, there is the previously documented effect of investment on some of the explanatory variables in our analysis (insider ownership and ownership concentration, among other things; see Pindado and de la Torre, 2006).

To check for potential misspecification of the models we used the $m_2$ statistic, which tests for lack of second-order serial correlation in the first-difference residuals. As shown in Tables 4–6, this hypothesis of second-order serial correlation is always rejected for all our models. Furthermore, Sargan's statistic of overidentifying restrictions rejects the existence of any correlation between the instruments and the error term in all the models. Finally, Tables 4–6 provide

Table 5
Estimation for firms' groups

$$(I/K)_{it} = \beta_0 + (\beta_1 + \beta_2 IOD_{it} + \beta_3 DUM_{it} + \beta_4 IOD_{it} x DUM_{it})\,(CF/K)_{it} + \beta_5 Q_{it} + \beta_6 SI_{it} + d_t + \eta_i + \nu_{it}, \quad (1)$$

$$(I/K)_{it} = \alpha_0 + (\alpha_1 + \alpha_2 OCD_{it} + \alpha_3 DUM_{it} + \alpha_4 OCD_{it} x DUM_{it})\,(CF/K)_{it} + \alpha_5 Q_{it} + \alpha_6 SI_{it} + d_t + \eta_i + \nu_{it}. \quad (2)$$

| | Equation (3a) | Equation (4a) | Equation (3b) | Equation (4b) |
|---|---|---|---|---|
| Constant | 0.012* (0.002) | 0.013* (0.002) | 0.008* (0.001) | 0.016* (0.004) |
| $(CF/K)_{it}$ | 0.422* (0.038) | 0.552* (0.026) | 0.448* (0.029) | 0.555* (0.040) |
| $IOD_{it}(CF/K)_{it}$ | –0.214* (0.035) | | 0.112* (0.034) | |
| $OCD_{it}(CF/K)_{it}$ | | –0.428* (0.041) | | 0.387* (0.075) |
| $DUM_{it}(CF/K)_{it}$ | 0.640* (0.122) | 0.099 (0.077) | –0.094** (0.049) | 0.232** (0.104) |
| $IOD_{it}DUM_{it}(CF/K)_{it}$ | –0.709* (0.134) | | –0.329* (0.053) | |
| $OCD_{it}DUM_{it}(CF/K)_{it}$ | | 0.288* (0.077) | | –1.056* (0.158) |
| $Q_{it}$ | 0.079* (0.001) | 0.078* (0.002) | 0.082* (0.001) | 0.084* (0.003) |
| $SI_{it}$ | 0.185* (0.002) | 0.214* (0.004) | 0.199* (0.002) | 0.217* (0.007) |
| $t_1$ | 19.88 | 5.27 | 28.66 | 13.00 |
| $t_2$ | 10.78 | | | |
| $t_3$ | 5.39 | 6.07 | | |
| $z_1$ | 14 144.660 (6) | 3823.195 (6) | 12 469.354 (6) | 2431.494 (6) |
| $z_2$ | 21 624.955 (7) | 9390.404 (7) | 11 036.733 (7) | 1232.748 (7) |
| $m_1$ | –3.730 | –3.791 | –3.815 | –3.949 |
| $m_2$ | –1.393 | –1.332 | –1.206 | –1.060 |
| Sargan | 124.393 (122) | 124.198 (115) | 122.606 (122) | 110.118 (105) |

The regressions are performed by using the panel described in Table 2. Equations (3a) and (3b) correspond to equation (3) accounting for the interaction with the sample selection dummy ($SSD_{it}$) and financial constraint dummy ($FCD_{it}$), respectively. Equations (4a) and (4b) correspond to equation (4) accounting for the interaction with the sample selection dummy ($SSD_{it}$) and financial constraint dummy ($FCD_{it}$), respectively. $DUM_{it}$ denotes $SSD_{it}$ in equations (3a) and (3b), and it stands for $FCD_{it}$ in equations (4a) and (4b). The rest of the information needed to read this table is as follows: (i) heteroscedacity consistent asymptotic standard error in parentheses; (ii) * indicates significance at the 1 per cent level; (iii) $t_1$ is the $t$-statistic for the linear restriction test under the null hypothesis $H_0$: $\beta_1 + \beta_2 = 0$ in equations (3a) and (4a) and $H_0$: $\alpha_1 + \alpha_2 = 0$ in equations (3b) and (4b); $t_2$ is the $t$-statistic for the linear restriction test under the null hypothesis $H_0$: $\beta_1 + \beta_3 = 0$ in equations (3a) and (4a) and $H_0$: $\alpha_1 + \alpha_3 = 0$ in equations (3b) and (4b); $t_3$ is the $t$-statistic for the linear restriction test under the null hypothesis $H_0$: $\beta_1 + \beta_2 + \beta_3 + \beta_4 = 0$ in equations (3a) and (4a) and $H_0$: $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 = 0$ in equations (3b) and (4b); (iv) $z_1$ is a Wald test of the joint significance of the reported coefficients, asymptotically distributed as $\chi^2$ under the null of no relationship, degrees of freedom in parentheses; $z_2$ is a Wald test of the joint significance of the time dummies, asymptotically distributed as $\chi^2$ under the null of no relationship, degrees of freedom in parentheses; (v) $m_i$ is a serial correlation test of order $i$ using residuals in first differences, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation; and (vi) Sargan is a test of the overidentifying restrictions, asymptotically distributed as $\chi^2$ under the null, degrees of freedom in parentheses

Table 6
Robustness check

| | Equation (3a) | Equation (4a) | Equation (3b) | Equation (4b) |
|---|---|---|---|---|
| Constant | 0.010* (0.003) | 0.008* (0.002) | 0.009* (0.002) | 0.003 (0.002) |
| $(CF/K)_{it}$ | 0.436* (0.067) | 0.528* (0.015) | 0.364* (0.081) | 0.596* (0.034) |
| $IOD_{it}(CF/K)_{it}$ | –0.264* (0.069) | | 0.271* (0.101) | |
| $OCD_{it}(CF/K)_{it}$ | | –0.415* (0.026) | | 0.236* (0.056) |
| $DUM_{it}(CF/K)_{it}$ | 0.736* (0.219) | –0.030 (0.059) | –0.098 (0.097) | 0.136** (0.077) |
| $IOD_{it}DUM_{it}(CF/K)_{it}$ | –0.688 (0.232) | | –0.443* (0.106) | |
| $OCD_{it}DUM_{it}(CF/K)_{it}$ | | 0.475* (0.067) | | –0.922* (0.094) |
| $IO_{it}$ | –0.072* (0.012) | | –0.058* (0.007) | |
| $OC_{it}$ | | 0.224* (0.010) | | 0.167* (0.019) |
| $Q_{it}$ | 0.077* (0.001) | 0.074* (0.002) | 0.083* (0.002) | 0.080* (0.002) |
| $SI_{it}$ | 0.183* (0.003) | 0.214* (0.003) | 0.185* (0.004) | 0.211* (0.004) |
| $t_1$ | 7.14 | 8.89 | 9.27 | 17.10 |
| $t_2$ | 6.07 | | | 8.36 |
| $t_3$ | 1.81 | 9.77 | 1.88 | 1.74 |
| $z_1$ | 3755.902 (7) | 9316.357 (7) | 4248.665 (7) | 3369.325 (7) |
| $z_2$ | 3455.457 (7) | 19 406.862 (7) | 4221.232 (7) | 38 866.113 (7) |
| $m_1$ | –3.753 | –3.795 | –3.845 | –3.992 |
| $m_2$ | –1.542 | –1.046 | –1.304 | –0.889 |
| Sargan | 120.910 (139) | 124.622 (121) | 123.997 (146) | 125.956 (136) |

The regressions are performed by using the panel described in Table 2. Equations (3a) and (3b) correspond to the re-estimation of equation (3) accounting for the interaction with the sample selection dummy ($SSD_{it}$) and financial constraint dummy ($FCD_{it}$), respectively. Equations (4a) and (4b) correspond to the re-estimation of equation (4) accounting for the interaction with the sample selection dummy ($SSD_{it}$) and financial constraint dummy ($FCD_{it}$), respectively. $DUM_{it}$ denotes $SSD_{it}$ in equations (3a) and (3b), and it stands for $FCD_{it}$ in equations (4a) and (4b). The rest of the information needed to read this table is as follows: (i) heteroscedacity consistent asymptotic standard error in parentheses; (ii) * indicates significance at the 1 per cent level; (iii) $t_1$ is the $t$-statistic for the linear restriction test under the null hypothesis $H_0$: $\beta_1 + \beta_2 = 0$ in equations (3a) and (4a) and $H_0$: $\alpha_1 + \alpha_2 = 0$ in equations (3b) and (4b); $t_2$ is the $t$-statistic for the linear restriction test under the null hypothesis $H_0$: $\beta_1 + \beta_3 = 0$ in equations (3a) and (4a) and $H_0$: $\alpha_1 + \alpha_3 = 0$ in equations (3b) and (4b); $t_3$ is the $t$-statistic for the linear restriction test under the null hypothesis $H_0$: $\beta_1 + \beta_2 + \beta_3 + \beta_4 = 0$ in equations (3a) and (4a) and $H_0$: $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 = 0$ in equations (3b) and (4b); (iv) $z_1$ is a Wald test of the joint significance of the reported coefficients, asymptotically distributed as $\chi^2$ under the null of no relationship, degrees of freedom in parentheses; $z_2$ is a Wald test of the joint significance of the time dummies, asymptotically distributed as $\chi^2$ under the null of no relationship, degrees of freedom in parentheses; (v) $m_i$ is a serial correlation test of order $i$ using residuals in first differences, asymptotically distributed as $N(0, 1)$ under the null of no serial correlation; and (vi) Sargan is a test of the over-identifying restrictions, asymptotically distributed as $\chi^2$ under the null, degrees of freedom in parentheses.

two Wald tests, $z_1$ and $z_2$, of the joint significance of the reported coefficients and of the time dummies, respectively.

## 4. Results

Table 4 reports GMM estimation of equations (1) and (2). As in previous studies, firms' investment is correlated positively with cash flow (regardless of the level of insider ownership and ownership concentration) and with Tobin's q. We also find that the sensitivities of investment to cash flow are influenced significantly by insider ownership and ownership concentration after controlling for firm size. Furthermore, as shown in the first column of the table, the coefficient on cash flow when there is convergence of interests ($\beta_1 + \beta_2 = 0.313$, which is statistically significant, see $t_1$ in Table 4) is smaller than the coefficient under managerial entrenchment ($\beta_1 = 0.511$). Consistent with Hypothesis 1a, these results suggest that aligning the interests of owners and managers weakens the sensitivity of the firm's investment to cash flow, whereas managerial entrenchment seems to strengthen it. Similar results are reported in the second column of Table 4 regarding ownership concentration. Specifically, the sensitivity of investment to cash flow under monitoring ($\alpha_1 + \alpha_2 = 0.288$, which is statistically significant, see $t_2$) is lower than that under expropriation ($\alpha_1 = 0.454$), which allows us to anticipate the benefits of monitoring exerted by concentrated ownership in mitigating the dependence of investment on cash flow as predicted in Hypothesis 1b. Consistent with Pawlina and Renneboog (2005), our preliminary results suggest that the sensitivity of investment to cash flow in firms with free cash flow problems might be lowered by aligning the interests of owners and managers and by monitoring managerial activity. Contrary to Hadlock (1998), these estimates suggest that corporate ownership is a mechanism to reduce the sensitivity of investment to cash flow, not only in overinvestor but also in underinvestor firms. However, since this evidence corresponds to the full sample, it is not conclusive on the matter.

To test definitively Hypothesis 1 and learn whether the role of corporate ownership differs between overinvestor and underinvestor firms in accordance with Hypothesis 2, we estimated equations (3) and (4), which allowed us to distinguish between firms according to their propensity to underinvest or overinvest. As shown in the first two columns of Table 5, the positive coefficient on cash flow observed for the full sample remains for the two groups of firms, even after controlling for Tobin's q. This evidence suggests that cash flow per se affects the investment of the two groups of firms and, therefore, that both underinvestment and overinvestment have the potential to explain the sensitivity of investment to cash flow, depending on the type of firm. Our main interest focuses on the role played by insider ownership and ownership concentration in the sensitivity of investment to cash flow in each of these two alternative scenarios. Therefore, we turn our attention to the estimated coefficients on cash flow interacted with ownership and sample selection dummies.

As shown in the first column of Table 5, aligning the interests of owners and managers proves to be helpful in avoiding both underinvestment and overinvestment. In underinvestor firms, investment is less sensitive to cash flow when there is a convergence of interests between owners and managers ($\beta_1 + \beta_2 = 0.208$, which is statistically significant, see $t_1$), and more sensitive to cash flow when managers become entrenched ($\beta_1 = 0.422$). Similarly in overinvestor firms, the investment-cash flow sensitivity is higher under entrenchment ($\beta_1 + \beta_3 = 1.062$, which is statistically significant, see $t_2$) than under convergence of interests ($\beta_1 + \beta_2 + \beta_3 + \beta_4 = 0.139$, which is statistically significant, see $t_3$). These estimates corroborate our Hypothesis 1a. The second column of the table reports estimates of equation (4). The results for underinvestor firms show that the sensitivity of investment to cash flow under monitoring ($\alpha_1 + \alpha_2 = 0.124$, which is statistically significant, see $t_1$ in the second column of the table) is lower than that under expropriation ($\alpha_1 = 0.552$). Similarly for overinvestor firms, the estimated coefficient on cash flow when there is monitoring by concentrated ownership ($\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4 = 0.412$, which is statistically significant, see $t_3$ in the second column of the table; $\alpha_3$ not statistically different from 0) is smaller than that under expropriation ($\alpha_1 + \alpha_3 = \alpha_1 = 0.552$, $\alpha_3$ not statistically different from 0). These estimates corroborate Hypothesis 1b.

On the basis of these results, the alignment of interests between owners and managers and the monitoring of managerial activity both mitigate agency conflicts in the firm, which in turn makes the investment decision more efficient; hence, lessening underinvestment and overinvestment problems. The next question is whether or not this benefit is higher for firms that suffer from overinvestment. The first column of Table 5 shows that the reduction in the investment-cash flow sensitivity caused by the alignment of interests is more pronounced in overinvestor firms ($|-\beta_2 - \beta_4| = 0.923$) than in underinvestor firms ($|-\beta_2| = 0.214$).[15] According to this evidence, the convergence of interests between owners and managers proves to be more helpful in avoiding overinvestment problems; hence, confirming Hypothesis 2a. In contrast, the monitoring of managers by large outside owners is more useful in firms suffering from underinvestment problems. As shown in the second column of the table, the negative impact of monitoring on the investment-cash flow sensitivity is more pronounced for underinvestors ($|-\alpha_2| = 0.428$) as compared to overinvestors ($|-\alpha_2 - \alpha_4| = 0.140$). A potential explanation of the better role of monitoring in avoiding underinvestment problems is that large outside owners may encourage managers to undertake value-creating projects, even if it means that external finance at a higher cost is required. This way, shareholders benefit from the value created by new investments, and also from managers being monitored by the market.

[15] Note that this reduction is obtained by computing the difference between the investment cash-flow sensitivity under entrenchment and the investment-cash flow sensitivity under convergence of interests. For underinvestor firms, this difference is $[\beta_1 - (\beta_1 + \beta_2)]$, whereas for overinvestor firms it is $[(\beta_1 + \beta_3) - (\beta_1 + \beta_2 + \beta_3 + \beta_4)]$.

It is worth noting that our estimates for the underinvestor group cannot be considered definitive, because the free cash flow criterion is not suitable for identifying financially constrained firms. Therefore, we checked previous results for underinvestor firms by re-estimating equations (3) and (4) after replacing the sample selection dummy, $SSD_{it}$, with a dummy variable identifying financially constrained firms, $FCD_{it}$. As shown in the last two columns of Table 5, the estimates for constrained firms reveal that the sensitivity of investment to cash flow is higher when there is a convergence of interests between owners and managers ($\beta_1 + \beta_2 = 0.560$, which is statistically significant, see $t_1$ in the third column of the table) as compared to that under managerial entrenchment ($\beta_1 = 0.448$). Consistent with Hadlock (1998), the alignment of interests translates into higher underinvestment in financially constrained firms. Similarly, the second column of the table reports a coefficient of the cash flow variable when there is monitoring by large outside owners ($\alpha_1 + \alpha_2 = 0.942$, which is statistically significant, see $t_1$ in the fourth column of the table) higher than when controlling owners manage to expropriate the rents of minority shareholders ($\alpha_1 = 0.555$). Therefore, the monitoring of managerial activity translates into higher underinvestment in financially constrained firms.

These results are not so surprising if we take into account that the conclusion that underinvestment is the source of the sensitivity of a firm's investment to cash flow relies on the assumption that managers' decision-making is guided by the owners' best interests, which may not always coincide with those of prospective shareholders and creditors. Following this reasoning, the more aligned the interests of insiders are, the more likely and severe the conflicts of interest between owners and creditors and between current and future shareholders and, consequently, the higher the risk that underinvestment will occur.

Finally, the results in Table 5 for unconstrained firms reproduce those previously obtained for overinvestors. This is important because it means that the negative consequences of aligning interests and monitoring for investment efficiency only hold in firms that suffer from financing constraints in capital markets.

## 5. Robustness check

Jensen and Meckling (1976) argue that firms' investment is affected by the ownership structure choice. Consequently, insider ownership and ownership concentration are expected to have an effect on the level of investment. To check whether the results reported in the previous section remain largely unchanged after controlling for the independent effect of corporate ownership, we have re-estimated all our models by including the standalone ownership variables ($IO_{it}$ and $OC_{it}$), in addition to the interaction terms.

The results of this robustness check are provided in Table 6, which reports the re-estimation of equations (3) and (4) by using both the sample selection

dummy ($SSD_{it}$) and the financial constraint dummy variable ($FCD_{it}$).[16] It is worth noting that the findings commented on in the previous section about the impact of corporate ownership on underinvestment and overinvestment processes remain practically identical once the independent effect of ownership has been controlled for.

## 6. Conclusions

This paper investigates how ownership affects the sensitivity of investment to cash flow of a sample of quoted Spanish firms according to their propensity to underinvest or overinvest. The estimation results reveal that investment is sensitive to cash flow and that the dependence of investment on cash flow is somehow driven by the firm's ownership structure.

First, aligning the interests of owners and managers and monitoring managers' decision-making represent, in general, effective mechanisms for controlling for both free cash flow and underinvestment problems. However, controlling owners will probably pursue their self-interests by promoting higher investment, even beyond its optimum, or by foregoing profitable projects when external capital is required.

Second, aligning the interests of owners and managers proves to be more helpful in avoiding overinvestment problems, whereas monitoring managers' decision-making is more useful in firms suffering from underinvestment problems.

Third, the convergence of interests between owners and managers and the monitoring of managerial activity by large outside owners translate into higher underinvestment in financially constrained firms. Therefore, it seems that aligning the interests of insiders exacerbates the conflicts between them and creditors and future shareholders, which increase the firm's financial constraints and, probably, its underinvestment.

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[16] The re-estimation results of the basic models in equations (1) and (2) will be provided by the authors upon request.

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