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## Analyzing the Effect of Excess Cash Accumulation on Financial Decisions

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## Analyzing the Effect of Excess Cash Accumulation on Financial Decisions

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### Abstract

In this current moment of crisis it is very important for firms to hold a suitable amount of cash. But it is also very important to analyze how this amount of cash affects firm value. Here an in-depth study is made of the determination of firm value centering our attention on the problem of excess cash accumulation. This paper adds important value to the existing literature since, employing the panel data methodology in the sample of Spanish non-financial firms, it identifies whether excess cash holding affects firm value in general, and investment, financing and dividend decisions in particular. The results show how asymmetric information among the economic agents of the firm affects the cash reserves. In particular, shareholders could penalize the investment made by these firms and consider the positive effect that the debt in particular and the dividend policies exert on the firm. Moreover, the results reveal the importance of financial flexibility as opposed to the arguments provided by agency theory.

JEL Classification: G30, G39.

Key words: Cash holdings, financial decisions, agency problems.

## I. Introduction

In this current moment of crisis it is very important for firms to hold a suitable amount of cash. But more important still is to analyze how this amount of cash affects firm value. Within a framework of imperfect capital markets, the cash reserves held by a firm become a relevant factor of study that can affect the firm's value. Given the information asymmetries that exist among the different economic agents of a firm, it may be costly to maintain a certain financial flexibility. In this context, it becomes necessary to study the agency conflicts and the information asymmetries between capital providers and managers that can affect the value of cash holdings for a particular company. We therefore pose the question: How do corporate cash holdings affect the valuation of the main financial decisions in the firm?

Furthermore, there is a lack of methodologically consistent empirical studies that allow us to obtain the main results –at least in Spain- and define the current state of the firms as regards excess cash. Thus, a study of the topic of cash holding, using rigorous panel data analysis, unquestionably makes an important contribution to the literature since it yields highly reliable results. We call attention in particular to the last model –a dynamic one- in which the existence of both the individual effect and the endogeneity of the variables is taken into account. Moreover, the added value of the current study is precisely the manner in which we deal with this issue because until now the accumulation of cash holdings in the firm has not been considered in Spanish studies, even though it is this fact in particular that directly affects overinvestment problems. For this reason we outline here a set of guidelines for companies about the use of their investment, financing and dividend policies so that they can create value by taking into account the excess cash that they may hold. We thus go deeply into the determination of firm value by centering our attention on the problem of a cash accumulation in excess since this could affect firms' investing in negative net present value (NPV) projects. To do so, we analyze the overinvestment problem motivated by the differences in interests between the shareholders and the management and taking into account explicitly the effect of cash accumulation on the firm. The contribution of the current study is that, up until now, the investment opportunities (IO) of the firm have been considered, but not the cash holding variable and its influence on overinvestment problems (even regardless of the firm's IO). As Apreda (1999) argues, we must be able to deal with the core financial decision-making and deal with agency

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3 problems so that we can handle the value enhancement. Therefore, aspects such as the treatment of  
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5 problems among agents and the solution to them must be included in the analysis of the cash holdings.  
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7 Likewise, we consider whether the results obtained until now are also applicable to other  
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9 institutional frameworks like the Spanish one, clearly continental and characterized by a high  
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11 concentration of property and a barely active market for the corporate control. These characteristics may  
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13 be the reason why firms do not accumulate cash according to the schemes of the agency literature and  
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15 why other factors such as financial flexibility may be more important, given the scarce protection of  
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17 shareholders' rights. In this sense, Blau and Fuller (2008) argue that cash holding –even in excess, one  
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19 could say- is desirable in firms in order to maximize financial flexibility and indeed, managers will have  
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21 to do a trade-off between controlling agency problems (Jensen, 1986) and providing financial flexibility  
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23 to reduce investment distortions (Myers and Majluf, 1984). Thus, after considering in a model the  
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25 determining factors of cash holding already studied in the literature (when posing model 2), the CH  
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27 residuals are calculated (whose results are available from the author). Then, the agency relationship is  
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29 highlighted in a concrete (excess) cash problem and the agency problem is analyzed considering the cash  
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31 holdings and also their influence on firm value, taking into consideration the influence of investment,  
32  
33 financing and dividend policies, respectively.  
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35 The results show how asymmetric information among the economic agents of the firm affects the  
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37 cash reserves. Shareholders could penalize the investment made by these firms and consider the positive  
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39 effect that the debt and the dividend policies exert on the firm. These last two mechanisms act jointly to  
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41 control the agency problem between management and shareholders, the debt mechanism in particular.  
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43 These results are qualified by the institutional frame of Spain, which provides certain new norms of firm  
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45 behavior in the face of cash accumulation which support the argument of financial flexibility. In our  
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47 opinion, the results are of great interest, given that they contribute evidence in the sense that we should be  
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49 cautious about generalizing results often obtained concerning firms in other institutional frames. In fact,  
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51 our results are in the same line as certain recent publications such as that by Bates et al. (2009), whose  
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53 conclusions are similar to ours: the precautionary motive is very important in explaining cash  
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55 accumulation, whereas they do not find consistent evidence that agency conflicts contribute to clearly  
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57 increasing the use of cash ratios.  
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59 In this study, the work is structured as follows: first, we analyze the value of the firm depending on  
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debt, dividend policy, and the firm's investment decisions. Next, we discuss the effect of corporate cash

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3 holdings on the valuation of the firm's financial decisions. In the following section, the empirical model is  
4 developed and each of the variables used is described. In the fifth section the results are presented and in  
5 section six some conclusions are drawn.  
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## 10 11 12 **II. Lower Investment Opportunities and Firm Value**

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15 The seminal work of Modigliani and Miller has served as a reference for numerous research works  
16 that relaxed their “irrelevance” propositions, focusing on the imperfections of capital markets. In an  
17 imperfect capital markets framework, the value of having a certain financial flexibility can vary due to the  
18 information asymmetries present among the firm’s different economic agents. When considering the  
19 effect of information asymmetry on the firm, we may run into a distortion associated with the firm’s  
20 investment decisions: overinvestment, that is, the fact that not all projects with negative NPV are rejected  
21 (Myers, 1977; Jensen, 1986). The free cash flow theory (FCF)<sup>1</sup>, posed by Michael Jensen in the 1980s,  
22 analyzes this problem. The use made of the free cash flow plays an important role in the analysis of the  
23 shareholder-management agency conflict. The managers will choose to invest the FCF since a greater  
24 growth of the firm will allow them to consume more funds through salary increases or perquisites and, on  
25 the other hand, growth favors their objectives of power, prestige and promotion. However, the FCF must  
26 be distributed to the shareholders (if the firm is efficient and maximizes their wealth), thus reducing the  
27 amount of resources that can be used discretionally by the managers, and thus reducing their power and  
28 capacity to become involved in investment projects that will not maximize firm value in the future<sup>2</sup>.  
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43 When we have a firm with low investment opportunities (hereafter LIO), the overinvestment  
44 problem is exacerbated if the excess cash is not distributed to the shareholders. The managers of LIO  
45 firms, since they have discretion over how to put accumulated cash flows to use, may be tempted –by  
46 following personal objectives- to overinvest in projects which from the shareholders’ point of view have  
47 negative NPV (Stulz, 1990). Indeed, Chirinko and Schaller (2004) show how firm managers with high  
48 levels of FCF and low investment opportunities use effective discount rates of between 350 and 400 basic  
49 points lower than those used by shareholders when valuing investments. We can thus pose a first basic  
50 affirmation in the sense that the greater the information asymmetry between ownership and management  
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59 <sup>1</sup> Free cash flow is defined as the cash flow generated over and above that required to finance investment projects  
60 with positive NPV, once capital costs have been subtracted (Jensen, 1986).

<sup>2</sup> The proposition of value maximization points out that managers should carry out all decisions that increase the total market value of the firm in the long run. See Jensen (2001) for an exposition of the organizational objective of value maximization.

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3 (agency problems between shareholders and managers) the greater the discount applied by shareholders in  
4 valuing the investments made by the firm. Thus,  
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9 *H1: Investment will be less valued –and could even be negatively valued- in firms with information*  
10 *asymmetry and LIO*  
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15 The relationship between capital structure and investment policy distortions has been studied in  
16 depth from the contractual perspective, analyzing it as a function of the firm's investment opportunities  
17 (Gul, 1999). There is undoubtedly a wealth of evidence about the benefits and costs of maintaining a  
18 capital structure with a greater or lesser debt component and its relation to investment distortions in the  
19 firm. We can recall in this sense the works of Hart and Moore (1990), Stulz (1990), Harris and Raviv  
20 (1991), Gaver and Gaver (1993); Gul (1999), and Goyal, Lehn and Racic (2002), among others.  
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25 The analysis of capital structure maintains that managers set a debt objective, seeking a balance  
26 between the benefits and costs of debt<sup>3</sup>. Debt benefits include tax benefits, ownership concentration and  
27 control of problems associated with FCF (Steward and Glassman, 2001). Debt costs include those relating  
28 to financial insolvency and the agency conflicts between shareholders and bondholders. In the context of  
29 the shareholder-management agency conflict, debt is seen as a control mechanism that obliges managers  
30 to pay out the FCF instead of investing it in projects with a negative NPV or wasting it on organizational  
31 inefficiencies, hindering the excessive growth of this type of firm (Lang, Ofek and Stulz, 1996). Issuing  
32 debt not only obliges managers to part with the firm's available funds, but also increases managers'  
33 exposure to the control of capital markets, when they demand capital to finance new investment projects.  
34 Additionally, Shleifer and Vishny (1986) argue that in mature industrial sectors with low capital  
35 requirements, debt financing adds the benefit of facilitating ownership property concentration. The lost  
36 value due to inefficient management will be more evident in each equity share, increasing shareholders'  
37 motivation to become involved in management control.  
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53 The optimal capital structure will thus be determined by the trade-off between the benefits of debt  
54 to prevent investment in projects with negative NPV and the debt costs to hinder investment in positive  
55 NPV projects (Stulz, 1990). We would thus expect IO firms to have lower debt levels than LIO firms.  
56 Hence, another basic affirmation that we can make is that firms with low investment opportunities will  
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<sup>3</sup> Recently, the paper by Yu and Aquino (2009) tests the capital structure by contrasting the explanatory power of both the trade-off model and the pecking order theory.

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3 tend (or should tend) to increase the debt component of their capital structure, thus controlling the  
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5 overinvestment problem (Stulz, 1990; Smith and Watts, 1992; Gaver and Gaver, 1993; Gul, 1999; Goyal,  
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7 Lehn and Racic, 2002). Therefore,  
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11 *H2: Debt will increase the firm's value and be more valued in firms with information asymmetry*  
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13 *and LIO.*  
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17 The same framework used to analyze the capital structure of LIO firms can be employed for  
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19 analyzing the dividend policy of this type of firm. In this sense, authors such as Rozeff (1982),  
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21 Easterbrook (1984), Jensen (1986), Schooley and Barney (1994) have analyzed the payment of dividends  
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23 as a control mechanism for mitigating agency problems associated with FCF. According to this theory,  
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25 the frequent distribution of dividends helps to distribute the cash flow to the shareholders, instead of  
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27 leaving it in the hands of managers who could have used this cash flow for their own personal gain or  
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29 invested in negative NPV projects. Furthermore, the sharing of dividends forces firms to resort to the  
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31 capital market to obtain funds in the future, making it possible for the shareholders to have greater control  
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33 over the management. According to this evidence, LIO firms should use dividend policy to mitigate the  
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35 overinvestment problem and thus avoid investing the accumulated FCF in non-profitable investment  
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37 projects. As a result:  
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41 *H3: Shareholders will positively value a greater distribution of dividends in firms with information*  
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43 *asymmetry and LIO.*  
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47 Finally, it is important to add that, although dividend payment is a means of distributing FCF to  
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49 the shareholders, it can occasionally be less desirable than debt control, basically for two reasons: it is a  
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51 contractually lax mechanism, since it is controlled to a great extent by firm management, and does not  
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53 have the tax benefits of debt. Nevertheless, the debate over the complementary or substitutive effect of  
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55 debt and dividends as a control mechanism of the firm is still latent.  
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### III. Introducing a New Element: Excess Accumulated Cash in the Firm

Research into the consequences of accumulating cash to a greater or lesser extent has long been absent from the literature, despite the fact that corporate liquidity has an important effect on the firm's financial decisions<sup>4</sup>. Thus, on the one hand, maintaining greater financial flexibility lets the firm carry out investment projects without having to resort to capital markets, reducing the costs of the information asymmetry between investors and managers. On the other hand, however, liquidity has high potential costs since it allows managers to invest in negative NPV projects or incur in organizational inefficiencies that destroy shareholder wealth. Hence our intention to attempt to take liquidity into account when determining firm value.

A commonly used approach in the literature to identify the distortions in investment policy is to discriminate the sample of companies using one of the different approaches of the market to book ratio as proxy for Tobin's  $q$ , thus assessing the investment opportunity set of each firm<sup>5</sup>. For example, Lang, Stulz and Walkling (1991) found that firms with good investment opportunities (a high market to book ratio), show no overinvestment problems. However, Harford (1999) observes an important fact to take into consideration: once the companies have accumulated high levels of cash, overinvestment problems are seen in companies both with high and low market to book ratios. This indicates that distortions in investment decisions depend highly on the levels of cash reserves held by the companies, regardless of their investment opportunities.

From this perspective we can see the importance of cash flow management<sup>6</sup> and its relation to the investment policy<sup>7</sup>. What is at first an accumulation of cash to defend against unforeseen circumstances in the future can increase to the point of providing managers with broad discretion in investment decisions (Harford, 1999) and consequently, lead to an interrelationship among the different corporate governance structures and the cash reserves (Harford et al., 2008). The empirical evidence indicates that firms should accumulate cash to finance their investment projects; however, too much cash can be expensive for shareholders (Opler Pinkowitz, Stulz & Williamson, 1999). Thus, managers should accumulate the cash necessary for financing profitable investment projects and distribute the excess cash to the shareholders

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<sup>4</sup> This topic of liquidity has been studied on many occasions from the short term point of view, as reflected in Bastos and Pindado (2007), in contrast to the long-term perspective that we emphasize.

<sup>5</sup> See Lang and Litzeberg (1989) or Denis (1991) among others.

<sup>6</sup> We define the cash flow generated by the firm as the net benefits plus depreciation and provisions.

<sup>7</sup> In fact, using two panels of Italian firms, Galeotti et al. (1994), provide support for the fact that internal and external financial sources are not perfect substitutes when capital markets are imperfect.

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3 instead of accumulating it and investing it in negative NPV projects since otherwise an excessive  
4 accumulation of cash will increase overinvestment. Thus,  
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9 *H4: Investments financed with excess cash will be less valued -and even valued negatively.*  
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13 With respect to capital structure and the problem of cash accumulation that we are posing, we must  
14 stress the contribution made in this sense by Jensen and Meckling (1976), who discuss another type of  
15 conflict that can affect firms when they accumulate cash: the difference in the interests of shareholders  
16 and bondholders. They observed that in firms with a high debt component and greater risk of financial  
17 insolvency, a good part of the firm's value will be in the hands of bondholders. Given that cash  
18 accumulation is a risk free investment, shareholders will negatively value an increase in liquidity levels  
19 since their benefits will go mainly to the bondholders (Pinkowitz & Williamson, 2007)<sup>8</sup>.  
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27 There are therefore two potential risks faced by shareholders: the risk that management will waste  
28 the accumulated cash (Jensen, 1986) and the risk that the benefits of accumulating cash will go to the  
29 bondholders (Jensen & Meckling, 1976). In both cases, the costs of maintaining high financial flexibility  
30 will exceed the benefits, destroying shareholder wealth. For all of these reasons, the shareholders in this  
31 type of firm (as opposed to the managers) will prefer that the accumulated cash be distributed in greater  
32 dividend payments or that the debt mechanism be employed as controller of that cash. In this sense,  
33 DeAngelo, DeAngelo and Stulz (2004) observed that the overinvestment problem intensifies when firms  
34 distribute a low dividend, and instead have accumulated a large amount of cash. Their results show how  
35 the firms that distribute dividends maintain a positive relationship with their cash accumulation. We can  
36 thus pose the following hypotheses 5 and 6 to be tested:  
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50 *H5 and H6: In the face of excessive cash accumulation, shareholders will positively value greater*  
51 *debt or greater distribution of dividends.*  
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<sup>8</sup> Remember that bondholders are given preference to collect their debts when the firm is liquidated.

#### IV. Model, Sample and Methodology

In order to test our model, we constructed a panel of 119 Spanish non-financial quoted companies for the period ranging from 1992 to 1999, giving us an unbalanced panel comprising 830 observations<sup>9</sup>. The main source of information was the public database from the CNMV (Spanish Security Exchange Commission). CNMV is the agency in charge of supervising and inspecting the Spanish Stock Markets and the activities of all the participants in those markets. The purpose of the CNMV is to ensure the transparency of the Spanish market and the correct formation of prices in it, to protect investors and to promote the disclosure of any information required to achieve these goals. More specifically, we used the data collected in the form "Interim Financial Reports for all quoted companies". These reports gather information about entity data, annual accounts (balance sheet and profit and loss accounts), issuer's semi-annual economic/financial reporting, information gathered from official company registers, book-entry deeds, trading prospectuses, general prospectuses, relevant and significant events, and more recently, corporate governance information, major holdings and own shares and internal behavior code as well. Furthermore, data on the market value of the company shares were extracted from the Daily Bulletin of the MSE (Madrid Stock Exchange).

INSERT Table 1, 2 and 3.

Now we are going to show briefly the main characteristics of the sample through the Panel data distribution (Table 1), where we can see the number of firms in relation to the number of consecutive years for which data were available (from five to eight). Table 2 shows the distribution of the sample by years and finally Table 3 shows the number of firms by industry. We can see how the highest number of firms (440) were functioning for eight consecutive years, which gives us a preliminary idea about the quality of the data because luckily we have a substantial data series (by years and by firms). The sample is very homogenous over the years and it can be seen that building and commerce are the most active industries in this time period.

In a first stage, we estimated a basic model which is nothing more than a static model in which financial decisions (investment, financing and dividends) and their contribution to the value of the firm are analyzed. But since we are limiting our study to those firms with lower investment opportunities, after

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<sup>9</sup> This result is after refining the sample; at the beginning, we obtained an initial sample of 1,016 firms over the total period.

observing the distribution of firms as a function of their IOs, we studied those whose Tobin's q was lower than the median and made a dummy variable that takes a value of 0 if ( $q \leq \text{median}$ ), such that for the firms in our study the expected sign of the investment coefficient should be negative.

The Basic Model:

$$MV_{it} = \alpha_i + INV_{it} (\beta_1 + \gamma_1 IO_{it}) + Lev_{it} (\beta_2 + \gamma_2 IO_{it}) + DIV_{it} (\beta_3 + \gamma_3 IO_{it}) + \beta_4 ROA_{it} + \beta_5 Size_{it} + d_t + d_s + \eta_i + v_{it} \quad (1)$$

$MV_{it}$  is the firm value measured through the market to book ratio defined as: book value of total assets minus the book value of equity plus the market value of equity, divided by total assets. We used the variable  $INV$  as a measure of the capital investment of the firm divided by total assets. Capital investment was defined as:  $AMN_t - AMN_{t-1} + DM_t$  where  $AMN$  stands for the net fixed assets and  $DM$  for the fixed assets annual depreciation<sup>10</sup>. Firm leverage ( $Lev$ ) was measured using total debt ratio over total assets (Pinkowitz and Williamson, 2007; Dittman *et al.*, 2007).  $Div$  is the dividend payout ratio, defined as the current year's net income percentage distributed in the form of dividends (Faulkender, Milbourn and Thakor, 2006). The current dividend was calculated as the down payment dividend in year  $t$  plus the complementary dividend paid in  $t+1$ . In order to select those firms with LIO, we created a dummy variable to proxy investment opportunities (Tobin's q measured by means of the market to book ratio). This is a measure of the degree of information asymmetry<sup>11</sup>. Thus,  $IO$  takes a value of 0 if the  $IO$  is lower than the median and 1, otherwise. Because the firm's profitability influences its market value, we introduced the variable  $ROA$ , measured as net income before all the expenses that did not generate a cash outflow (depreciations and provisions) over total assets net of cash (Pinkowitz and Williamson 2007; Dittman *et al.*, 2007). Finally, we included the size of the company ( $Size$ ), measured as the natural logarithm of total assets. As in the estimation of the model we used the panel data methodology, we also take into account the time effect  $d_t$  and the sector effect  $d_s$ , as well as the individual effect  $\eta_i$  which captures the constant unobservable heterogeneity of firms, such as industrial effects, special differences in

<sup>10</sup> This investment measure enables negative values to enter into the variable which can indicate investment and disinvestment.

<sup>11</sup> As Harford (1999) suggests, this measurement captures the degree of information asymmetry between managers and external capital providers (Harford, 1999). A good part of the value of firms with a high average market to book ratio comes from their growth opportunities and intangibles. This type of firm is expected to have more problems in certifying the value of an investment project, as compared to firms with a relatively low market to book ratio, the value of which will depend mainly on their fixed assets, given their low investment opportunities.

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3 types of assets, differences in the form of management, etc., and specific factors over time such as  
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5 economic cycles. We also included in the model a time variable and 10 sectoral dummy variables. All the  
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7 variables entering the model were corrected with Winsor at 1% and 99% to avoid having atypical data  
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9 bias our results.

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13 *The model made more explicit with the cash holdings*

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15 In second place, we have to consider explicitly in the analysis the inclusion of the cash  
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17 accumulated by the firms. One problem when approaching the expected effect that cash accumulations  
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19 have on financial decisions is to try and separate the different elements that come into play when a firm  
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21 accumulates cash to a greater or lesser extent. In principle, it seems clear that firms with excessive cash  
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23 holdings are going to have profiles, problems and guidelines different from those of firms with a normal  
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25 level of cash holdings, and from those with insufficient cash holdings. Thus, to observe the effect of cash  
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27 accumulation on the main financial decisions of the firm, it is necessary to analyze what level of cash is  
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29 suitable for each firm (Opler, Pinkowitz, Stulz & Williamson, 1999; Harford, 1999). In this sense, we  
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31 posed a liquidity model that would allow us to predict a level of cash accumulation that is high, low or  
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33 “normal” for each firm  $i$  in each period  $t$ , then use the residuals of that estimation.

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35 Thus, in this second stage and before analyzing the effect of financial decisions on the value of the  
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37 firm, we constructed a model with which we can identify those firms with high and low cash reserves  
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39 (following Opler et al. (1999) and Faleye (2004)<sup>12</sup>). So we estimated a cross-sectional model for each year  
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41 in our sample. Using an annual cross-sectional estimation has the advantage of allowing the coefficients  
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43 of the model to change each year, allowing the cash determinants to vary over time (Faleye, 2004). The  
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45 cash accumulation model for each company  $i$  in every year  $t$  was given by the following equation, where  
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47 the dependent variable is the natural logarithm of the cash ratio (treasury and temporary financial  
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49 investments). This variable was normalized by total assets net of cash following Fama and French (1998),  
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51 Pinkowitz and Williamson (2007) and Dittman, et al. (2007), since heteroskedasticity problems can  
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53 arise<sup>13</sup>.

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<sup>12</sup> Since Opler et al. (1999) and Harford (1999), a great deal of research works in different fields of finance have used this type of approximation. See Pinkowitz (2002); Almeida *et al.* (2004); Lin (2007) and Dittman et al. (2007), among others.

<sup>13</sup> We obtained similar results when estimation was done scaling by sales.

$$CH_{i,t} = \alpha_i + \beta_1 MB_{i,t} + \beta_2 OCF_{i,t} + \beta_3 WC_{i,t} + \beta_4 VOCF_i + \beta_5 Lev_{i,t} + \beta_6 Size_{i,t} + \beta_7 Div_{i,t} + v_{i,t}$$

(2)

Now, following the literature, we detail the variables that affect the determination of cash accumulation in a firm. In the first place, there are the investment opportunities that the firm has. We used the market-to-book ratio (MB) as a proxy of investment opportunities in the firm defined previously. At this point, since we are analyzing cash and just as in the rest of the variables, we divide by the value of total assets net of cash (Opler *et. al.*, 1999; Pinkowitz, 2000). Because cash reserves also depend on the financial flexibility and income of the firm, we included the variables operating cash flow (OCF) and net working capital (NWC). Operating cash flow is defined as: net income before depreciations and provisions to total assets net of cash. Net working capital is defined as: short term assets minus short term creditors less cash divided by total assets net of cash. Cash flow volatility (VOCF) also affects the cash reserves positively. In this sense, firms with higher cash flow volatility should maintain higher cash levels in order to take advantage of the profits from new investment opportunities. Volatility is measured as the standard deviation of the cash flows generated (OCF) throughout our sample period. Furthermore, we considered leverage (Lev) defined as: total debt over total assets net of cash; the size of the company (Size) measured as the natural logarithm of the total assets net of cash and, a dummy variable that takes the value 1 if the firm distributes dividends and 0 otherwise (Div). Additionally ten dummy variables were included to control for the industry effect<sup>14</sup>. Finally, to avoid atypical data bias in our results, all variables were Winsorized at the 1% and 99% level (Pinkowitz, 2000; Dittman et al., 2007; among others). In Table 4 we show the descriptive statistics of the main variables with the means, standard deviation and maximum and minimum values obtained for each variable and in Table 5 we can see the results obtained for the different models analyzed<sup>15</sup>.

INSERT Table 4

Once we had estimated equation (2), we used the residuals obtained to generate a new variable which was to be used in the second stage of our analysis. As our aim was to identify the cash

<sup>14</sup> These industries were commerce, extractive, food, textile, paper, chemical, metals, transport, energy and building. We excluded the transport industry to avoid multi-collinearity.

<sup>15</sup> We also can show the residual estimations of cash holding accumulation it is required.

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3 accumulation in the firms of our sample, to contrast the different hypotheses outlined, we developed  
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5 equation (3), where the dependent variable is the market value of the firm. We began with a model similar  
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7 to the basic one explained above in which the explanatory variables were also detailed. The differences  
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9 were that 1) we included the variable Growth calculated as the annual change in the sales ( $sales_{it} - sales_{i,t-1}$ )  
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11 as the control variable of the IO, because at this we could not limit our study to the firms with  
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13 LIO since we were focusing on the study of cash, and 2) a dummy variable related to the cumulative  
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15 residuals of cash that discriminate between firms with greater and lesser cash reserves, such that CHI  
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17 will take a value of 1 when the cash reserves are low (splitting the sample into two according to cash  
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19 reserves) and a value of 0 in the opposite case. An advantage of this specification is that it allows the  
20  
21 firms to change category over time. Subsequently, we interacted the categorical variable with the  
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23 investment, debt, and dividend variables in equation (3).  
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$$26$$

$$27 \quad MV_{it} = \alpha_i + \beta_1 INV_{it} + \beta_2 INV_{it} * CHI_{it} + \beta_3 Lev_{it} + \beta_4 Lev_{it} * CHI_{it} + \beta_5 DIV_{it} + \beta_6 DIV_{it} * CHI_{it} +$$

$$28$$

$$29 \quad \beta_7 Growth_{it} + \beta_8 ROA_{it} + \beta_9 Size_{it} + d_t + d_s + \eta_i + v_{it} \quad (3)$$

$$30$$

$$31$$

$$32$$

33 We estimated the model using the Generalized Method of Moments (GMM) in two steps, also  
34  
35 known as system GMM<sup>16</sup>. We considered all the explanatory variables as endogenous, since the right-  
36  
37 hand side variables can be determined simultaneously with the dependent variable. So, when we  
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39 identified the independent variables as endogenous, we had to introduce an additional lag on the equation,  
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41 taking the lags  $t-s$  as instruments,  $s$  being equal or superior to 2. As the conventional fixed effects  
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43 estimator is biased, and this bias is inversely proportional to  $T$  ( $T$  being the number of years in the  
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45 sample), in order to eliminate this problem and improve efficiency, we applied the solution proposed by  
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47 Arellano and Bond (1991) using as valid instruments the right-hand side variables in the model lagged  
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49 twice or more. Finally, we took first differences of the variables in order to eliminate the individual effect.  
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<sup>16</sup> We used the Stata module Xtabond2 (2005) in the estimation. It is an extension of the original estimator of Arellano and Bond (1991), proposed by Arellano and Bover in 1995 and developed completely by Blundell and Bond in 1998.

## V. Results

The results of the estimation of the equations are given in Table 5. In the basic model (column one, Model I) in which we analyzed the influence of financial decisions on the firm value considering the IO, we can see that the investments undertaken by the LIO firms positively affect firm value. Perhaps this is because they take maximum advantage of the available IO because for this type of firms IO are scarce. Although at first it could seem that H1 is rejected, we can also see how in the remaining firms, those which have more IO, the value considerably increases; thus it could partially confirm the investment hypothesis that we outlined<sup>17</sup>. As regards the debt and the dividend policies, the coefficient is also positive and significant in those firms with lower IO, thus creating value in this way and confirming H2 and H3. Profitability also contributes to value creation and firm size has a negative sign, meaning that small firms possibly have fewer problems associated with overinvestment.

INSERT Table 5

Let us see what happens if we introduce the analysis of cash holdings into this static model (Model II). In this case we focus on analyzing what happens with firms that accumulate greater cash reserves in relation to the whole sample. These firms' investment is positive and significant and the same occurs with debt and dividends. As a curiosity it can be noted that the use of debt in the firms with the least cash reserves will be significantly lower; that is, this type of firm which has fewer problems with overinvestment does not use debt so much (although it still uses it) but rather uses its dividend policy to a greater extent (possibly using the cash generated).

In both cases, the estimation was done through the fixed effects method, eliminating the individual effect  $\eta_i$  where the unobservable constant heterogeneity of the firms is reflected, such as the industry effects, special differences in the assets type, management differences, etc., and specific time factors such as economic cycles. We performed the Hausman test, which indicated that the estimation indeed must be performed by fixed effects. But let us recall that there can be a problem of endogeneity. This is the reason why the following model outlined is estimated through a dynamic model (Model III) in which we considered all the explanatory variables as endogenous, since the right-hand side variables can be

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<sup>17</sup> This fact leads us to pose the need for a more specific future study related to a smaller number of firms but ones which very clearly have LIO (perhaps in which  $q < 1$ ). The problem is that in our sample there are very few firms with this profile.



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3 determined simultaneously with the dependent variable by utilizing the Arellano and Bond (1991)  
4 methodology, using as valid instruments the right-hand side variables in the model lagged twice or more  
5 and also considering the level equations in the estimation.  
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9 Thus, in this model we see how the results are significant and similar to the former model. It can  
10 also be observed that investment is slightly more valued in firms with less accumulated cash. Both  
11 investment and dividend variables create value for those firms with an excessive cash holdings level,  
12 corroborating hypothesis H6<sup>18</sup>.  
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16 However, if we go deeper into the analysis, by doing a linear restriction test (see T-Variables in  
17 Table 5), we can see how we reject the null hypothesis of equality of the two coefficients in the three  
18 cases  $H_0: \beta_1 + \beta_2 = 0$ ,  $H_0: \beta_3 + \beta_4 = 0$  and  $H_0: \beta_5 + \beta_6 = 0$ . Consequently, if we reject this null hypothesis, the  
19 hypothesis of difference of coefficient depending on the cash accumulation will be upheld. This means  
20 that for firms with lower cash holdings, more value is created so that H4 is also corroborated while these  
21 kinds of firms also prefer to employ the dividend mechanism at an even higher level than those firms with  
22 excessive cash<sup>19</sup> (although the dividend policy also continues acting as a control mechanism that  
23 positively affects the firm value in the high-cash firms). This explanation is consistent with the recent  
24 paper published by Cohen and Yahil (2009) showing a higher payout ratio for financially distressed firms  
25 than for financially stable firms. This result has also been corroborated by the results of Blau and Fuller  
26 (2008), who point out that on many occasions the financial flexibility argument has not been dealt with  
27 sufficiently, since from the agency point of view it was a given that 1) debt and dividends helped to  
28 reduce the conflict and 2) since the two acted in the same sense, they had to act as substitutes for each  
29 other (although in this respect the results were not conclusive). On this occasion we adhere to the  
30 argument proposed by Blau and Fuller (2008), which defend that firms generating high liquidity give out  
31 few dividends so that they can use the cash in future projects. This clearly justifies the fact that we obtain  
32 that the value of the firms having less cash increases comparatively with the paying of dividends (even if  
33 their influence on firm value is positive).  
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53 As regards the debt coefficient obtained, it totally corroborates H5 and the coefficient is highly  
54 significant. In this sense, Blau and Fuller (2008), point out that firms with less debt pay out fewer  
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59 <sup>18</sup> On the other hand, it could be that investment is valued positively if we have sufficient funds and financial  
60 flexibility in our firm. In this case, considering the trade-off argued by Blau and Fuller (2008), for managers the  
argument of providing financial flexibility to reduce investment distortions has more weight than controlling agency  
problems and thus the sign obtained is positive.

<sup>19</sup> In fact, it seems logical that those low cash firms will optimize their dividend policy due to their scarce cash.

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3 dividends, that is, it is an argument of complementarity based on the idea that firms with less possibility  
4 of going into debt value to a greater extent the argument of flexibility and thus do not reduce their  
5 payment of dividends. As a result, in the face of excess cash generation it is possible that the less indebted  
6 firms will not pay out dividends, which justifies our finding that firms with more cash generation can,  
7 apart from using the debt mechanism to solve overinvestment, also increase their debt because of the  
8 availability of the funds they have<sup>20</sup>. As a result, the dividend policy is employed together with the debt  
9 policy.  
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18 We furthermore included the former control variables (ROA and SIZE) when estimating the cash  
19 holdings and they are still significant and preserve the same sign. To control the IO, we introduced the  
20 GROWTH variable, which is negative and significant, something that in principle could indicate that the  
21 firms with lower IO take maximum advantage of the available IO (as we saw in H1) without incurring too  
22 much in overinvestment, basically because for this type of firms IO are scarce and because there are  
23 effective control mechanisms in the firm. This finding again supports the argument of financial flexibility  
24 and is endorsed by Gugler's (2003) arguments.  
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31 To check for potential misspecification of the models, we used the Hansen statistic of over-  
32 identifying restrictions, which tests for the absence of correlation between the instruments and the error  
33 term. Another specification test used was the statistic developed by Arellano and Bond (1991) to test for  
34 lack of first-order and second-order serial correlation in the first-difference residuals. Both the hypothesis  
35 of correlation between instruments and the error term, and the hypothesis of second-order serial  
36 correlation are always rejected. Table 5 also provides two Wald tests,  $z_1$  and  $z_2$ , which validate the joint  
37 significance of the reported coefficients and of the time dummies, respectively.  
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44 In general, the results show that the financial decisions of the firm -investment, leverage and  
45 dividends- and the market value related to them depend on the amount of cash held since all the  
46 alternative hypotheses analyzed are significant. The interactive dummy variable is always significant in  
47 relation to the omitted group. In particular, shareholders could penalize the investment made by these  
48 firms and consider the positive effect that mainly debt but also dividend policies exert on the firm.  
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54 In our view, the results obtained are consistent with those found by Bates et al. (2009) and reveal  
55 the importance of financial flexibility as opposed to the arguments of the agency theory. Moreover, these  
56 results are but the reflection of the characteristics of Spain (peculiar ones, in light of most of the existing  
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<sup>20</sup> In this sense see as well DeAngelo and DeAngelo (2006), who also support this argument and use it to explain firms' capital structure.

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4 literature) which undoubtedly contributes additional characteristics and variables to be taken in to account  
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6 in other countries within a continental institutional framework. Our findings thus bring to light certain  
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8 norms of firm behavior in the face of cash accumulation that support the financial flexibility of the firm.  
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## 10 11 12 **VI. Conclusions**

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14 This work analyzes the effect of cash holdings on the main financial decisions regarding the value  
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16 of the firm, outlining a set of guidelines for companies about the use of their policies so that they can  
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18 create value taking into account the excess cash that they may hold. We can see the importance of  
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20 maintaining financial flexibility when capital markets are imperfect. This paper adds an important value  
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22 to the existing literature since, employing the panel data methodology in the analysis, it identifies whether  
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24 cash holding in excess affects the firm value and the investment, financing and dividend decisions in  
25  
26 particular. Likewise, we focus on a specific topic –agency- which has not been studied in relation to Spain  
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28 and only barely studied in countries within the continental institutional framework, and have produced the  
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30 first results in this sense.  
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33 We first showed a basic firm value model considering the IO effect on the firm. Afterwards, we  
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35 outlined a model of liquidity to discriminate among the firms depending on their cash accumulation and  
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37 based on this classification we were able to see the effect of the accumulation of cash reserves on the  
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39 financial decisions mentioned above.

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41 The results show how asymmetric information among the economic agents of the firm affects the  
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43 cash reserves. In particular, we find that the financial decisions of the firm -investment, leverage and  
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45 dividends- and the market value related to them depend on the liquid assets held by the firm. In principle,  
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47 it could be thought that cash-rich firms may have overinvestment problems because although their  
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49 investments are positively valued, the remaining firms are still better valued. Shareholders could penalize  
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51 the investment made by these firms and, in any case, consider the positive effect that the debt and the  
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53 dividend policies exert on the firm. These last two mechanisms (the debt mechanism in particular) act  
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55 jointly to control the agency problem between management and shareholders. These results are qualified  
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57 by the Spanish institutional framework, which provides new forms of firm behavior in the face of cash  
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59 accumulation that support the argument of firm financial flexibility.  
60

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**Table 1. Panel data distribution**

Years	Freq.	Percent	Cum
5	105	12.65	12.65
6	96	11.57	24.22
7	189	22.77	46.99
8	440	53.01	100.00

Notes: This table shows the number of consecutive years by firm in the panel data sample

For Peer Review

**Table 2. Distribution of firms by years**

Years	Freq.	Percent	Cum
1992	90	10,84	10,84
1993	108	13,01	23,86
1994	111	13,37	37,23
1995	119	14,34	51,57
1996	119	14,34	65,90
1997	110	13,25	79,16
1998	94	11,33	90,48
1999	79	9,52	100,00

Notes: This table shows the number of firms for each year in the period 1992-1999.

**Table 3: Distribution of firms by industries**

Industry	Nº of firms	Percent	Cum
Extractive	28	3,37	3,37
Food	114	13,73	17,11
Textile	16	1,93	19,04
Paper	49	5,90	24,94
Chemical	89	10,72	35,66
Metals	48	5,78	41,45
Energy	94	11,33	52,77
Building	141	16,99	69,76
Commerce	171	20,60	90,36
Transport	80	9,64	100,00

Notes: This table shows the number of firms by industry.



**Table 4. Descriptive Statistics of the Sample**

Variables	Mean	Stand. Deviat.	Minimum	Maximum
Residual CH	-.3101496	3.543473	-29.14	8.98
MV	7.763357	17.57732	0.86	175.48
INV	.0666045	.1966582	-0.39	1.47
Lev	.5295449	.653005	.029	5.83
Div	.0254473	.063996	0.00	0.60
Growth	.5132266	2.996567	-0.95	27.09
ROA	.0702198	.2151599	-0.27	2.08
LnSize	10.19919	1.507344	7.25	14.81

Notes: This table shows the descriptive statistics of the sample with the means, standard deviation and maximum and minimum values obtained for each variable. Residual CH are the cumulative residuals of cash;  $MV_{it}$  is the firm value measured through the market to book ratio defined as: book value of total assets minus the book value of equity plus the market value of equity, divided by total assets; INV is the capital investment of the firm divided by total assets; Lev is the total debt ratio over total assets; Div is the dividend payout ratio, defined as the current year's net income percentage distributed in the form of dividends; Growth is the annual change in sales; ROA is the net income before all the expenses that did not generate a cash outflow (depreciations and provisions) over total assets net of cash and Size is the natural logarithm of total assets.

Table 5: Results of the estimation

Models	I	II	III
INV	6.488132* (0,015)	9.099708* (0,000)	9.646339* (0,000)
INV.IO	4.0223 (0.236)		
INV.CH1		.6980014 (0,645)	.7396193** (0,043)
Lev	8.375943* (0,000)	13.6806* (0,000)	15.13803* (0,000)
Lev.IO	3.151473** (0,047)		
LevCH1		-3.78273* (0,000)	-4.5324* (0,000)
DIV	105.1252* (0,000)	62.55221* (0,000)	86.71456* (0,000)
DIV.IO	-42.81466 (0,109)		
DIV.CH1		4.954303* (0,000)	6.012157* (0,000)
Growth		-.057366 (0,513)	-.2015361* (0,000)
ROA	4.504283** (0,055)	9.208146* (0,000)	15.80001* (0,000)
Size	-6.57989* (0,000)	-6.486757* (0,000)	-.8826399* (0,000)
T-INV			83.118
T-Lev			34.133
T-DIV			83.346
Hausman		110,68 (15)	
z <sub>1</sub>			180000(9)
z <sub>2</sub>			494,89(6)
m <sub>1</sub>			-1.66
m <sub>2</sub>			0.74
Hansen			97.77 (306)

Notes: i) \* Indicates significance at the 1% level and \*\* at the 5% level ii) T-Var is the t-statistic for the linear restriction test under the following null hypothesis iii) p-value in parentheses. iv) z<sub>1</sub> is a Wald test of the joint significance of the reported coefficients asymptotically distributed as  $\chi^2$  under the null of no relationship; z<sub>2</sub> is a Wald test of the joint significance of the time dummies; degrees of freedom in parentheses. v) m<sub>i</sub> is a serial correlation test of first and second order using residuals in first differences asymptotically distributed as N(0,1) under the null of no serial correlation. vi) Hansen is a test of over-identifying restrictions, asymptotically distributed as  $\chi^2$  under the null; degrees of freedom in parentheses. vii) Hausman is a test of the differences between two estimations, asymptotically distributed as  $\chi^2$  under the null; degrees of freedom in parentheses.

INV is the capital investment of the firm divided by total assets; Lev is the total debt ratio over total assets; IO takes a value of 0 if the Tobin's q is lower than the median and 1, otherwise; CH1 is a dummy variable taking the value of 1 when the cash reserves are low and a value of 0 in the opposite case; Div is the dividend payout ratio, defined as the current year's net income percentage distributed in the form of dividends; Growth is the annual change in sales; ROA is the net income before all the expenses that did not generate a cash outflow (depreciations and provisions) over total assets net of cash and Size is the natural logarithm of total assets.