

ACCRUALS QUALITY AND CORPORATE CASH HOLDINGS

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ABSTRACT:

This work uses panel data for firms listed in the Spanish stock exchange over the period from 1995 to 2001 to analyse the effect of accounting quality on cash holdings. The results show that firms with good accruals quality hold lower cash levels than firms with poor accruals quality. This finding suggests that the quality of accounting information may reduce the negative effects of information asymmetries and adverse selection costs, allowing firms to reduce their level of corporate cash holdings. The results also show that cash holdings decrease when firms increase their use of bank debt and in the presence of cash substitutes. In contrast with this, firms with higher cash flow hold higher levels of cash.

Keywords: Accounting quality, accruals quality, cash holdings, information asymmetry.

JEL Classification: G31, G32

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INTRODUCTION

Recent theoretical research models (Easley, Hvidkjaer, and O'Hara, 2002; Easley and O'Hara, 2004) have shown that information asymmetry adversely affects the cost of capital. These models incorporate the assumption that the quality of accounting information is a non-diversifiable risk factor, and so the differences in information across investors affect the cost of capital for the firm. Lambert, Leuz and Verrechia (2006), on the other hand, show that accounting information may affect the cost a firm must pay for capital by influencing the market participants' assessments of the distribution of future cash flows. They do, however, acknowledge the effect of information asymmetry on the cost of capital in the case of imperfect competition.

As a consequence, empirical research has investigated the role of accounting quality as a measure of information asymmetry in different contexts. Empirical studies show that higher accounting quality reduces information asymmetry and this leads to a lower cost of capital and cost of debt (Bhattacharya, Daouk and Welker, 2003; Francis, Lafond, Olsson and Schipper, 2004; Francis, Lafond, Olsson and Schipper, 2005), higher investment efficiency (Biddle and Hilary, 2006; Verdi, 2006), and a lower adverse selection component of trading costs around earnings announcements (Bhattacharya, Desai and Venkataraman, 2007). Effectively, accounting quality, or more generally, financial reporting quality, can improve investment efficiency by reducing information asymmetry in two ways (Verdi, 2006): 1) Financial reporting quality reduces the information asymmetry between the firm and investors, and thus reduces adverse selection costs and lowers the cost of financing for the firm; and 2) Financial reporting quality reduces information asymmetry between investors and the managers, and, by mitigating agency conflicts, lowers the cost to shareholders of monitoring managers and improves project selection.

On the other hand, several studies have investigated the effects of asymmetric information on corporate cash holdings (Kim, Mauer and Sherman, 1998; Opler, Pinkowitz and Williamson, 1999; Dittmar, Mahrt-Smith and Servaes, 2003; Ferreira and Vilela, 2004; Ozkan and Ozkan, 2004, Garcia and Martinez, 2008), and have found that cash holdings are positively related to the degree of asymmetric information. Effectively, information asymmetry and agency conflicts make it difficult and expensive for firms to obtain funds. In these circumstances, firms may build up their liquid monetary assets to reduce the costs associated with dependence on external financing.

Drawing on this previous research, the aim of the present paper is to examine the effect of accounting quality on the level of cash holdings, a research issue which remains unexplored. Following previous studies on accounting quality (Francis et al., 2005; Verdi, 2006), we associate accounting quality with the accuracy with which financial reporting conveys information about expected cash flows in order to inform stakeholders. Thus, as in other papers, we focus on accruals quality as a proxy of accounting quality because accruals contain information about expected cash flows in order to inform stakeholders. Thus, earnings will be more representative of future cash flows if accruals are of good quality. We hypothesize that as accounting quality/accruals quality reduces information asymmetry, firms with higher accounting quality will need lower levels of cash holdings. In this way, the present paper contributes to the literature examining the economic implications of accounting quality and shows the important role that accruals quality plays as a determinant of the level of cash holdings. We use a sample of Spanish firms, which are well suited to our objective, as such firms are most likely to present lower accounting quality. Previous research (Lang, Smith and Higgins, 2003; Leuz, Nanda and Wysocki, 2003) has suggested that accounting quality is higher

in US and Anglo-Saxon countries. In this sense, Leuz et al. (2003) found lower levels of earnings management in Anglo-Saxon systems characterised by strong investor protection, large capital markets and dispersed ownership. In contrast, Spain is a continental country (a code law country) characterised by weak investor protection, a less developed capital market and a high concentration of ownership (La Porta, López-Silanes, Shleifer and Vishny, 1998; Faccio and Lang, 2002).

Our findings confirm an inverse relation between accruals quality and the level of cash holdings. Firms with poor accruals quality hold higher cash levels than firms with good accruals quality. Consequently, reporting high quality information in terms of accruals allows firms to hold lower levels of cash, reducing unproductive liquid resources on their balance sheets. These findings contribute to the debate regarding the role of accounting quality in reducing information asymmetries that impede efficient corporate investment policies, and provide valuable insights for managers, investors, creditors, and researchers. With respect to managers our results suggest that enhancing accounting quality firms may improve the management of cash holdings, reducing their cash levels in balance sheet and, consequently, improving investment efficiency. As far as investors and creditors are concerned, our results suggest that since firms with good accruals quality may improve the management of their investments, investors and creditors may incorporate, respectively, the quality of accounting information as a valuable factor into their discount rates and debt contract terms. For researchers, providing empirical evidence that accounting quality has economic implications for firms (management of cash), our findings extend prior research on the relevance of accruals quality, and suggest that future studies on cash holdings should control for accounting quality.

The paper proceeds as follows: in the second section we present the previous literature on accounting quality and cash holdings and discuss the hypotheses to be tested. In the third section we describe the data set, sample and variables. The fourth section describes the model specification. Our results are discussed in the fifth section, and concluding comments are in the final section.

PREVIOUS LITERATURE

Accounting quality, asymmetric information and cash holdings

Previous research has found that accounting quality can reduce information asymmetry between (1) the firm and investors, which results in lower adverse selection costs and lower financing costs for the firm, and (2) managers and shareholders, which leads to improved project selection (Verdi, 2006). Easley and O'Hara (2004) showed that in a model with informed and uninformed investors, private information increases the information risk faced by uninformed investors because informed investors are better able to incorporate new information and shift their portfolios. Consequently, this risk is incorporated by these investors, who demand a higher return. Nevertheless, if firms increase the quantity and quality of public information available to investors, firms can reduce information asymmetries with investors and lower their cost of financing. On the other hand, due to the information asymmetry conflict between managers and shareholders, accounting information, especially earnings, has been used by shareholders to monitor managers and reduce agency costs (principal-agent conflict) in setting executive compensation. Based on this, accounting quality may help the monitoring of managers by shareholders, reducing the agency conflict and improving investment efficiency (Verdi, 2006).

Thus, several studies have examined the effect of accounting quality on the cost of capital and the cost of debt (Bhattacharya et al., 2003; Francis et al., 2004; Francis et al., 2005), investment efficiency (Biddle and Hilary, 2006; Verdi, 2006), higher likelihood of providing collateral and higher debt maturity (Bharath, Sunder and Sunder, 2008) and adverse selection costs around earnings announcements (Bhattacharya et al., 2007).

These studies have used various proxies for accounting quality, including measures of accounting opacity (Bhattacharya et al., 2003), value relevance of earnings (Barth, Konchitchki, and Landsman, 2006), measures of earnings attributes (Francis et al., 2004; Biddle and Hilary, 2006), and accruals quality (Francis et al., 2005; Verdi, 2006; Bhattacharya et al., 2007; Bharath et al., 2008). The focus on accruals quality in most of these studies is based on the evidence (Dechow, 1994; Subramnayan, 1996) that accruals increase the ability to predict future cash flows. Thus, from the point of view of creditors, poor accruals quality will make it more difficult to estimate future cash flows (from which the debt repayments will be serviced) using accounting information. On the other hand, since accruals entail the estimation of future cash flows, accruals quality can affect the uncertainty about the future distribution of the firm's payoffs and thereby also affect the information asymmetry between informed and uninformed investors (Bhattacharya et al., 2007). As a consequence, poor accruals quality in borrowers should lead to a higher cost of debt and equity (Francis et al., 2005) and should also affect various contractual terms.

Biddle and Hilary (2006) and Verdi (2006) have focused on the effect of accounting quality on investment efficiency. Biddle and Hilary (2006) found that higher accounting quality improves investment efficiency (at firm level and country level) since it is associated with lower investment-cash flow sensitivity, and that this effect is

stronger in economies that depend more on public equity financing (US) than in countries where banks and creditors are the main suppliers of capital (Japan). On the other hand, Verdi (2006) shows that financial reporting quality reduces investment inefficiencies (underinvestment and overinvestment, respectively) in firms facing financial constraints and with large cash balances and free cash flows. Beatty, Liao and Weber (2007) added to this research by investigating how the source of financing affects the influence of accounting quality on a firm's investment cash flow sensitivity. They found that accounting quality reduces investment cash flow sensitivity for the firms that are more likely to face financial constraints, which suggests that accounting quality is likely to be more important for firms that have the largest information asymmetry problems.

In contrast to previous studies, our research is the first to focus on the effect of accounting quality on the level of cash holdings maintained by firms. Since previous studies have shown that accounting quality may reduce information asymmetry and influence in economic aspects of firms (cost of debt and capital, debt contract terms, and investment-cash flow sensitivity), and since information asymmetry is considered a main factor affecting the level of cash, we hypothesize that by reducing information asymmetry, accounting quality may improve a firm's management of cash, reducing spare resources which the firm may use to carry out more efficient investment decisions.

We use accruals quality as a proxy for accounting quality and hypothesize a negative relation between accruals quality and cash holdings. Since previous studies have considered that accounting quality may reduce information asymmetry and adverse selection costs, affecting the contract terms of debt financing and investment efficiency, we expect that firms with higher accounting quality will not need to maintain such high levels of cash holdings to finance their projects. Effectively, firms with higher accruals

quality will have easier access to raising debt (reduced information asymmetry between firm and investors) and at a lower cost, as shown in previous studies (Francis et al., 2005; Bharath et al., 2008). This implies that firms with good accruals quality do not need to maintain high levels of cash holdings to carry out their investment projects. At the same time, by reducing agency problems between shareholders and managers, accounting quality increases shareholder ability to monitor managers (Verdi, 2006) and, as a consequence, improves the management of cash. Consequently, we expect that accruals quality will allow firms to reduce unproductive cash investments on their balance sheets.

We link our research on accounting quality with those studies which investigate the effects of asymmetric information and agency costs on corporate cash holdings. The existence of asymmetric information makes it more expensive for firms to obtain external funds due to the problems associated with adverse selection. Myers and Majluf (1984) argue that, in the presence of information asymmetry, firms establish a hierarchy in their use of sources of financing; firms will prefer to finance themselves with internally generated resources before resorting to the market, especially when this option has a high cost. In this sense, firms can use cash holdings when they have difficulties in raising funds. Specifically, as pointed out by Faulkender and Wang (2006), corporate liquidity enables firms to make investments without accessing external capital markets, and thus, liquidity reduces the probability of incurring financial distress costs which arises when the firm's operations do not generate enough cash flow to repay debt.

Several studies (Kim et al., 1998; Opler et al., 1999; Dittmar, et al., 2003; Ferreira and Vilela, 2004; Ozkan and Ozkan, 2004, Garcia and Martinez, 2008) have found that cash is positively associated with the degree of asymmetric information

related to growth opportunities, size, debt maturity and banking relationships. Specifically, information asymmetry is higher in firms whose value is largely determined by their growth opportunities (Myers and Majluf, 1984), and those incurring higher external financing costs. Information asymmetries are also higher in smaller firms (Jordan, Lowe and Taylor, 1998; Berger, Klapper and Udell, 2001). Furthermore, on the basis of debt maturity structure models (for example Flannery, 1986, and Kale and Noe, 1990), debt with shorter maturity is also related with greater information asymmetry (Stohs and Mauer, 1996 and Guedes and Opler, 1996). Finally, another factor which may reduce information asymmetry and agency problems is the establishment of banking relationships between borrower and lender, which allow valuable information about the quality of the clients to be disclosed. Thus, according to various theoretical contributions (Leland and Pyle, 1977; Diamond, 1984; Boyd and Prescott, 1986), these stable links with financial institutions can improve both the availability and the conditions of financing, reducing its cost (Petersen and Rajan, 1994). In summary, firms with higher growth opportunities, smaller size, shorter debt maturity and less bank debt are expected to hold higher levels of cash.

DATA, SAMPLE AND VARIABLES

In our research we have used data from three different sources. First, from the Spanish Securities and Exchange Commission (CNMV) we have collected balance sheets and profit and loss accounts. Second, from the Daily Bulletin of the MSE (Madrid Stock Exchange) we have extracted data on the market value of the company shares. Third, from the publications of the Information Bureau of the Spanish Annotated Public Debt Market we have obtained interest rate data.

Our analysis uses half-yearly data of 65 listed companies between 1995 and 2001. We have selected those non-financial firms for which complete information was available for the period. Table I presents the distribution of firms by industry.

INSERT TABLE I

Dependent variable

The dependent variable has been measured in two ways. First, using the method employed by Ozkan and Ozkan (2004), we used the variable $CASH_1$, calculated as the ratio of cash and marketable securities to total assets. Second, we used the variable $CASH_2$, which is identical to $CASH_1$ except that in the denominator cash and marketable securities are subtracted from the total assets (Opler et al., 1999). The higher the values of both these measures, the higher the firm's cash level.

Accruals quality metric

We use accruals quality metrics which have been extensively used in prior research (Francis et al., 2005, Verdi, 2006; Bhattacharya et al., 2007). As in those studies, we deal with the conceptual definition of accounting quality which focuses on

the accuracy with which financial reporting conveys information about expected cash flows in order to inform stakeholders, particularly investors and creditors. Thus, since accruals are estimates of future cash flows, earnings will be more representative of future cash flows if accruals are of good quality. Moreover, to ensure that our measure of accruals quality is a good proxy for accounting quality in the sense of estimating future cash flows, we tested for the predictability of future cash flows according to different levels of accruals quality, and we found lower predictability of future cash flows for firms with poor accruals quality, which confirms the validity of our variable. These results are reported in detail in the Results section of this paper.

We base our analysis on the model developed by Dechow and Dichev (2002) and use accruals quality as a proxy for accounting quality. In this model accruals quality is measured by the extent to which current working capital accruals map onto operating cash flows of the prior, current and future periods. Thus, Dechow and Dichev (2002) regressed current working capital accruals (WCA_t) on cash flow from operations of the previous fiscal year (CFO_{t-1}), of the current year (CFO_t), and the subsequent fiscal year (CFO_{t+1}), all deflated by average total assets.

$$\frac{WCA_{it}}{AvgAssets_{it}} = \beta_0 + \beta_1 \frac{CFO_{i,t-1}}{AvgAssets_{it}} + \beta_2 \frac{CFO_{i,t}}{AvgAssets_{it}} + \beta_3 \frac{CFO_{i,t+1}}{AvgAssets_{it}} + \varepsilon_{it} \quad (1)$$

where:

WCA_{it} is working capital accruals of firm i in year t , calculated as the change in current assets (ΔCA), minus the change in cash and cash equivalents ($\Delta Cash$), minus the change in current liabilities (ΔCL) plus the change in short term bank debt ($\Delta Debt$).

CFO_{it} , CFO_{t-1} , and CFO_{t+1} signify cash flow from operations of firm i in years t , $t-1$ and $t+1$, respectively, calculated as the difference between net income before extraordinary

items (*NIBE*) and total accruals (*TA*). Total accruals are calculated for each firm in year *t*, following Dechow, Sloan and Sweeney (1995), as working capital accruals (WCA_{it}) minus depreciation and amortization expenses for the period (Dep_{it}).

All variables are deflated by average total assets in order to avoid problems of heteroskedasticity. Average total assets are calculated for firm *i* in year *t* as the mean of the firm's total assets in years *t*-1 and *t*. The model is estimated in its cross-sectional version for each industry-year combination, based on the industry classification of the Madrid Stock Exchange. The residual vector reflects the variation in working capital accruals unexplained by cash flows of the previous, current and subsequent periods. Therefore, the absolute value of the residual for each firm-year observation is an inverse measure of accruals quality ($AQ_DD_{it} = | \hat{\varepsilon}_{it} |$ (the higher the residual, the lower the accruals quality)).

We follow studies such as Francis et al. (2005), Verdi (2006), Doyle, Ge and McVay (2007), and Bharath et al. (2008), which used cross-sectional models of accruals quality. Specifically, as pointed out by Bharath et al. (2008, p.8), the cross-sectional estimates overcome the severe restrictions that apply to time series models, which introduce survivorship bias in the sample since they need to use firm-specific time series data. Furthermore, cross-sectional estimation controls for changes in accruals due to business cycle effects. Moreover, since studies such as Subramanian (1996) and DeFond and Subramanian (1998) gave evidence that cross-sectional models of abnormal accruals are better specified than their time-series version, it is more usual in the earnings management literature to use cross-sectional models, and given that we use different measures of abnormal accruals in order to test the robustness of our results, we opt to use cross-sectional models.

Our measure of accruals quality has, as any proxy, some limitations (McNichols, 2002; Wysocki, 2005; Doyle et al., 2007): a) the Dechow and Dichev (2002) model is applicable to working capital accruals, and the lags between non-current accruals and cash flow preclude its extension to total accruals (Francis et al., 2005: 302); b) the negative contemporaneous association between accruals and cash flow, which does not take into account accruals quality, may account for a portion of the explanatory power of the model; c) Accounting quality measures derived from this model may show weak associations with other measures of accounting quality. However, in order to further validate our results, we also examined other additional proxies of accruals quality to test the robustness of the results: Ball and Shivakumar's (2006) extension of Dechow and Dichev (2002); Peasnell, Pope and Young's (2000) margin model of discretionary accruals, and the standard deviation of the residuals from the industry-year estimations of the Dechow and Dichev (2002) model based on Francis et al (2005).

Other control variables

We controlled for other factors traditionally considered to be determinants of cash holdings by previous researchers. First, the existence of growth opportunities in firms is an important factor that positively affects cash levels. Firms whose value is largely determined by their growth opportunities have larger information asymmetry (Myers and Majluf, 1984), and consequently they incur higher external financing costs. They also suffer more serious agency conflicts associated with debt, which can lead to underinvestment problems (Myers, 1977). Hence we might expect firms with more investment opportunities to maintain higher liquidity levels, in order not to limit or cancel their profitable investment projects. In order to measure growth options (*GROWP*) and following Miguel and Pindado (2001), we use Tobin's q, calculated as

the ratio between the firm's market value and the replacement value of its capital. We expect a positive relationship with the dependent variable.

Second, we use the log of sales as a proxy for size (*SIZE*). Smaller firms have more information asymmetry and a negative relationship with the amount of liquid assets held is expected. Moreover, traditional models to determine the optimal cash levels (Baumol, 1952; Miller and Orr, 1966), or more recent models such as that of Mulligan (1997), demonstrate that there are economies of scale associated with the cash levels required to manage the normal transactions of the firm, so that larger firms can keep lower cash holdings. Thus, we would expect a negative relation between firm size and cash holdings

Third, we measured the debt maturity structure with variable *LTDEBT*, calculated as long-term debt divided by total assets (Barclay and Smith, 1995). Shorter debt maturity is related to a higher level of asymmetric information (Stohs and Muer, 1996; Guedes and Opler, 1996, etc.). Guney, Ozkan and Ozkan (2003) and Ferreira and Vilela (2004) pointed out that the use of short term debt increases the risk of refinancing. As a consequence, firms with a larger proportion of short term debt will keep higher cash levels in order to avoid financial distress. Consequently, a negative relationship between debt maturity and cash holdings is expected.

The relationship with financial institutions (*BANKD*) has been approximated by considering the debt levels that the firms maintain with their banks. Ozkan and Ozkan (2004) suggest that firms with a higher proportion of bank debt will be able to access external financing more easily, so they do not need to maintain such high cash levels. Specifically, *BANKD* is calculated as the ratio of bank debt to total debt. The expected relationship between this variable and a firm's cash holdings is negative.

Following Kim et al. (1998), the opportunity cost of the capital invested in liquid

assets (*RSPREAD*) has been measured as the difference between the return on the firm's assets (gross operating profits/assets) and the return on Treasury bills. According to these authors this variable should be negatively related to cash holdings.

To control for leverage, we included the variable *LEV*, measured as the ratio of total debt over total assets. A firm's leverage may be negatively related with cash holdings, because the costs of the funds used to invest in liquid assets rise as financial leverage rises (Baskin, 1987). In addition, as John (1993) maintains, firms that can access the debt market can resort to borrowing as a substitute for liquid assets, although constrained firms prefer higher cash levels to lower debt. The empirical evidence (Kim et al., 1998; Opler et al., 1999; Ferreira and Vilela, 2004; Ozkan and Ozkan 2004) demonstrates a reduction in cash levels when firms increase their financial leverage. According to previous research, a negative relationship between *LEV* and *CASH* is expected.

To measure the existence of other liquid assets that may substitute for cash, following Opler et al. (1999), Ferreira and Vilela (2004), Ozkan and Ozkan (2004) and Garcia and Martinez (2008), we have calculated the ratio of working capital less cash to total assets (*LIQ*). We would therefore expect firms with more non-cash liquid assets to reduce their cash levels.

The capacity to generate cash flows has been approximated by dividing pre-tax profits plus depreciation by sales (*CFLOW*). Kim et al. (1998) claim that the relationship is in fact negative, as they consider that cash flows represent an additional source of liquidity for the firm and can therefore substitute cash. However, according to the hierarchy theory (Myers and Majluf, 1984), firms prefer to fund themselves from internally generated resources before resorting to the market. In these circumstances, firms with large cash flows will keep higher cash levels, as confirmed by Opler et al.

(1999) and Ozkan and Ozkan (2004), for the US and British markets respectively, or by Ferreira and Vilela (2004) for European Monetary Union (EMU) countries. Therefore, we would expect firms with larger cash flows to hold more cash.

The likelihood of financial distress could affect a firm's decision in relation to cash holdings, although there is a controversy about the direction of this influence. Guney et al. (2003), Ferreira and Vilela (2004) and Ozkan and Ozkan (2004) argue that firms in financial distress could raise their cash levels in order to reduce their default risk. However, Kim et al. (1998) expect firms with a greater likelihood of financial distress to have lower levels of liquidity because of firms having difficulties in meeting their payment commitments cannot accumulate cash, since they will use any liquid resources available to pay what they owe. The likelihood of financial distress is calculated according to the re-estimation of Altman's (1968) model carried out by Begley, Mings and Watts (1996), given by the following expression:

$$ZSCORE=0.104*X_1 + 1.010*X_2 + 0.106*X_3 + 0.003*X_4 + 0.169*X_5$$

where X_1 = Working capital / Total assets; X_2 = Retained earnings / Total Assets; X_3 = Net operating profits / Total assets; X_4 = Book value of capital / Book value of debt; X_5 = Sales / Total assets

A higher *ZSCORE* implies a lower default risk. Its effect on cash holdings is not at all clear.

Finally, we include the dummy *DIV* in our regressions to control for the potential impact of the firm's dividend policy on its cash holdings. This variable takes the value one if firms distribute dividends and zero otherwise. Dividend policy may also affect levels of cash holdings, but there is some controversy about the direction.

According to Opler et al. (1999), firms paying dividends will have lower cash levels, because they can obtain funds at lower cost by reducing dividend payments to their shareholders. However, Ozkan and Ozkan (2004) point out that firms that usually pay dividends can also hold more cash in order to have enough cash to support their pay out policy. The expected relationship with the level of cash holdings is not clear.

In Table II we present the descriptive statistics of the variables. The mean and median values for $CASH_1$ are respectively 7.14% and 4.05%. Those values reach 8.80% and 4.22% for $CASH_2$. That indicates that the investment in cash is a significant component of total assets. Moreover, the average leverage ratio of the firms is 49.04% and the 29.19% of the assets are financed with long term debt. The bank debt represents, on average, 36.80% of total debt.

INSERT TABLE II

MODEL SPECIFICATION

According to Ozkan and Ozkan, (2004), cash decisions are explained following a partial adjustment model to a target cash ratio. This fact has also been confirmed by Garcia and Martinez (2008) for Spanish firms. Considering the impact that accruals quality could have on cash levels, and including other determinants previously considered in the literature, we estimated the following dynamic panel data model:

$$CASH_{it} = \beta_0 CASH_{it-1} + \beta_1 AQ_DD_{it} + \beta_2 GROWP_{it} + \beta_3 SIZE_{it} + \beta_4 LTDEBT_{it} + \beta_5 BANKD_{it} + \beta_6 RSPREAD_{it} + \beta_7 LEV_{it} + \beta_8 LIQ_{it} + \beta_9 CFLOW_{it} + \beta_{10} ZSCORE_{it} + \beta_{11} DIV_{it} + \eta_i + \lambda_t + v_{it} \quad (2)$$

where $CASH_{it}$ measures cash holdings; AQ_DD_{it} is an inverse proxy of accruals quality; $GROWP_{it}$ measures growth options; $SIZE_{it}$ firm size; $LTDEBT_{it}$ long term leverage;

*BANKD*_{it} bank debt; *RSPREAD*_{it} opportunity cost of keeping cash; *LEV*_{it} leverage; *LIQ*_{it} investment in other liquid assets; *CFLOW*_{it} cash flows; *ZSCORE*_{it} the probability of financial distress; *DIV* is a dummy variable that takes the value 1 if the firm has paid dividends; η_i represents firms specific effects (unobservable heterogeneity); λ_t temporary effects; and ν_{it} random disturbances.

η_i is designed to measure unobservable characteristics of the firms that have a significant impact on the firm's cash holdings. They vary across firms but are assumed to be constant for each firm. Examples include attributes of managers such as ability and motivation. They may also include industry-specific effects such as entry barriers or market conditions. The parameters λ_t are temporary dummy variables that change over time, but are equal for all firms in each period considered. In this way, we have tried to include the economic variables which firms cannot control (interest rates and prices, for example).

The estimations have been carried out using the generalized method of moments (GMM), which allows us to control for endogeneity by using instruments. Specifically, we follow the estimation strategy proposed by Arellano and Bond (1991), which consists of using all the right-hand side variables lagged twice or more as instruments¹.

This methodology assumes that there is no second-order serial correlation in the errors in first differences. For this reason, in order to test the consistency of the estimations, we used the test for the absence of second-order serial correlation proposed by Arellano and Bond (1991). Similarly, we employed the Sargan test for over-identifying restrictions, which tests for the absence of correlation between the instruments and the error term (Sargan, 1958).

RESULTS

Preliminary Analysis

Firstly, to ensure the validity of the measure of accruals quality (AQ_DD), we have classified the sample by AQ_DD quintiles. Next, for each quintile we have regressed current cash flows on lagged cash flows and net income, controlling for firm effects. The results obtained (Table III) show that the highest fit of the regressions is for the firms with the lowest values of AQ_DD (higher accruals quality), Q_1 , and that the fit decreases when the values of AQ_DD increase (accruals quality decreases). In this way, the lower predictability of future cash flows for higher values of AQ_DD supports the notion that the variable AQ_DD is a good proxy for measuring accounting quality.

INSERT TABLE III

Regression results

In Table IV we report the results of the estimations of Equation 2. The estimations have been carried out using the 2-stage GMM estimator. The model has been estimated using two proxies for the dependent variable. In Column 1, the dependent variable is $CASH_1$ and in Column 2 $CASH_2$. The results for both dependent variables are, in general, consistent.

INSERT TABLE IV

We find that AQ_DD has a positive and significant effect on the level of cash holdings. Specifically, at the 10% level on $CASH_1$ (at the 5% for a one-tail test²), and at the 1% level on $CASH_2$. That is, firms with higher values of AQ_DD (poorer accruals quality) need to maintain higher levels of cash holdings than those with higher accruals quality. This result is consistent with our hypothesis that accounting quality reduces information asymmetry and thus allows a more efficient structure of assets with lower

levels of cash holdings. Firms with higher accounting quality can obtain funds more easily from creditors to finance their projects and thus they can reduce the opportunity cost of having higher level of cash holdings. In contrast with this, as firms with lower accounting quality face more information asymmetry costs, they have to build up their monetary assets to reduce the costs associated with dependence on external financing. This result is also consistent with previous research which has shown the role of higher accounting quality in improving firms' economic and financial aspects such as investment efficiency (Biddle and Hilary, 2006; Verdi, 2006), cost of debt and equity (Bhattacharya et al., 2003; Francis et al., 2004; Francis et al., 2005), and trading costs around earnings announcements (Bhattacharya et al., 2007).

Considering the control variables, we found a positive relationship between *CASH* and *LTDEBT*. In contrast with what we expected, firms with more long term debt maintain higher level of cash holdings. Moreover, the relation with the variable *BANKD* is negative and significant at the 1% level. As expected, firms which can easily get funds from banks keep lower levels of cash. In this way, we also found that the level of cash is lower for more indebted firms, since those firms incur higher costs for keeping cash (variable *LEV* is significant at 1% level).

The presence of other liquid assets is another explanatory factor of the level of cash holdings (*LIQ* is significant at 1% level). This supports the hypothesis that firms with more liquid assets will tend to reduce their cash levels, as these assets can be used as cash substitutes. In addition, the relationship between *CASH* and *CFLOW* is positive and significant at the 1% level. This relationship shows that firms which generate larger cash flows possess greater cash holdings, as was expected.

On the other hand, we did not find a significant relationship between cash holdings and growth opportunities (*GROWP*), which is consistent with the results of

Guney, et al. (2003) for other countries integrated in the continental model such as France and Germany. The variable SIZE³ is not significant either, which may be explained, as Ozkan and Ozkan (2004) point out, because other factors may affect the way in which a company's size affects its cash holding decisions. In this way, we also found no significant relationship with the opportunity cost of the capital invested in liquid assets (RSPREAD). Nor did we find a significant relationship with the likelihood of financial distress and the dummy variable DIV. This may be explained in terms of the opposite effects each of these variables is expected to have on cash holdings and the possibility that the effects cancel each other out. All those non-significant results are consistent with a previous study made in the Spanish market of the determinants of cash holdings (Garcia and Martinez, 2005).

Robustness of results to different measures of accounting quality

In order to assess the robustness of the results obtained with the Dechow and Dichev (2002) measure of accruals quality, in this section we considered other proxies for accruals quality and repeated the analyses reported in the previous section.

Our second proxy for accruals quality was calculated following the Ball and Shivakumar (2006) model, which includes three variables in addition to those used in the Dechow and Dichev (2002) model:

$$\frac{WCA_{it}}{AvgAssets_{it}} = \beta_0 + \beta_1 \frac{CFO_{i,t-1}}{AvgAssets_{it}} + \beta_2 \frac{CFO_{i,t}}{AvgAssets_{it}} + \beta_3 \frac{CFO_{i,t+1}}{AvgAssets_{it}} + \beta_4 \frac{\Delta CFO_{it}}{AvgAssets_{it}} + \beta_5 D + \beta_6 D \frac{\Delta CFO_{it}}{AvgAssets_{it}} + \varepsilon_{it} \quad (3)$$

Where ΔCFO is the change in the cash flow from operations used as a proxy for gain or loss, D is a dummy variable which takes the value 1 if ΔCFO is negative and 0

otherwise, and $D \frac{\Delta CFO_{it}}{AvgAssets_{it}}$ is the interaction between both variables. This model tries to incorporate into the conventional linear accruals models the asymmetry in gain and loss recognition. As in the previous models, the Ball and Shivakumar model is estimated in its cross-sectional version for each industry-year combination, and the absolute value of the residual for each firm-year observation is an inverse measure of accruals quality ($AQ_BS_{it} = | \hat{\varepsilon}_{it} |$).

A third proxy for accruals quality was calculated based on the margin model proposed by Peasnell et al. (2000). We estimated the following cross-sectional regression for each year and industry:

$$\frac{WCA_{it}}{A_{i,t-1}} = \beta_0 + \beta_1 \frac{REV_{it}}{A_{i,t-1}} + \beta_2 \frac{CR_{it}}{A_{i,t-1}} + \varepsilon_{it}, \quad (4)$$

where REV is total sales, and CR is total sales minus change in trade debtors. The absolute value of the residual for each firm-year observation is our third inverse measure of accruals quality ($AQ_Margin_{it} = | \hat{\varepsilon}_{it} |$).

The fourth proxy we used, following Francis et al. (2005), was based on the standard deviation of the residuals from the industry-year estimations of the Dechow and Dichev (2002) model estimated in equation (1). Instead of the absolute value of the residuals for each firm, we instead computed an inverse measure of accruals quality for firm i in year t as the standard deviation of firm i 's residuals from the industry-year regressions, $\hat{\varepsilon}_{it}$, calculated over periods $t-4$ to t , $AQ_sdDD_{it} = \sigma(\hat{\varepsilon}_i)_t$. Larger standard deviations of residuals indicate poorer accruals quality.

In Table V, from Columns 1 to 3, we present the results using these three additional measures of accruals quality and relating them to $CASH_1$ as the dependent variable. For Column 4 to 6 the dependent variable is $CASH_2$.

INSERT TABLE V

The results confirmed the effect of accruals quality on cash holdings found in the prior analysis. In all the estimations, the coefficients on the alternatives measures of accruals quality are positive and significant at the 1% level. Therefore, we can confirm that firms keep more cash when accounting quality is lower. With reference to the rest of the determinants, we also found support for previous estimations, and found a significant relationship (and with the same sign) for variables *LTDEBT*, *BANKD*, *LEV*, *LIQ* and *CFLOW*.

CONCLUSIONS

Previous studies of the determinants of cash holdings have focused on the effects of asymmetric information and agency costs on corporate cash holdings, due to the fact that asymmetry makes it more difficult and expensive for firms to obtain external funding as a result of the problems associated with adverse selection. In this situation, under asymmetric information, empirical studies have shown that firms respond by holding higher cash balances.

Recently, the accounting literature has shown the important role of the quality of accounting information in reducing asymmetries between firms and investors. Thus the purpose of the present research is to contribute to the financial literature examining the effect of accounting quality on corporate cash holdings, given that there is no previous, direct evidence on this important issue. We used accruals quality as a proxy for accounting quality and tested our hypotheses in a panel data sample of Spanish firms for the period 1995 to 2001. In order to control for unobservable heterogeneity and for potential endogeneity problems we employed GMM methods of estimation.

The results show that firms with good accruals quality keep lower levels of cash than firms with poor accruals quality, which suggests that the quality of accounting information may reduce the negative effects of information asymmetries and adverse selection costs on the availability of external financing. Thus, higher accounting quality allows firms to reduce their liquid assets. This result is consistent with previous research which has shown that accruals quality improves investment efficiency and reduces the cost of debt financing.

Our results also provide support for the positive effect of banking relationships in reducing asymmetric information between borrower and lender, and also that firms with higher capacity to generate cash flows possess higher liquidity assets. We find as well that the existence of substitutes for cash reduces a firm's cash levels. In addition, more leveraged firms hold lower levels of cash.

Our findings contribute to the debate regarding the role of accounting quality in reducing information asymmetries. The results also provide valuable insights for managers, investors, creditors and researchers. Our findings suggest that managers should be concerned about accounting quality because a higher accounting quality may help firms to improve the management of cash holdings, keeping lower levels of cash, and as a consequence, reducing unproductive cash levels on balance sheets and increasing investment efficiency. With respect to investors and creditors, our results suggest that since firms with good accruals quality may improve the management of their investments, investors and creditors, respectively, may incorporate the quality of accounting information as a valuable factor into their discount rates and debt contract terms. For researchers, providing empirical evidence that accounting quality has economic implications for firms, our findings extend prior research on the relevance of accruals quality, and suggest that future studies on cash holdings should control for

accounting quality. Finally, although most of the literature which studies the effect of accounting quality on reducing asymmetric information is focused on Anglo-Saxon countries, our findings confirm that accounting quality also matters in a continental country like Spain, characterised by low investor protection and high concentration of ownership.

In conclusion it should be noted that our study has several limitations. First, as with any measure, our proxies of accruals quality are subject to certain limitations (McNichols, 2002; Wysocki, 2005). Second, we have focused on accruals quality, but there are other attributes of earnings, such as persistence, predictability, timeliness and value relevance (Francis et al., 2004) which could have an influence on cash holdings. The extension of our research to these different attributes of earnings in future investigations of the effect of earnings attributes on corporate cash holdings would be extremely worthwhile.

¹ Up to the fourth lagged level of the independent variables are included as instruments.

² We have to consider that because the alternative hypothesis to the null is that coefficient of AQ_DD is positive, a one-tail test applied to the coefficient in Model 1 Table IV is significantly different from zero at the 5 percent level.

³ This result does not change if we use other proxies for firm's size, such as the log of total assets or the log of market capitalisation

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Table I: Sample by industry*

Sector	Number of Firms	%
Consumer goods	16	24.62%
Basic materials and industry	21	32.31%
Power	7	10.77%
Construction	5	7.69%
Technology and Telecommunications	5	7.69%
Market services	11	16.92%
Total	65	100%

*Industry classification according to Madrid Stock Exchange

Table II: Descriptive statistics

CASH₁ is calculated as the ratio of cash and marketable securities to total assets. CASH₂ is similar to CASH₁ except that in the denominator cash and marketable securities are subtracted from the total assets. AQ_DD is an inverse proxy of accruals quality; GROWP measures growth options; SIZE firm size; LTDEBT long term leverage; BANKD bank debt; RSPREAD opportunity cost of keeping cash; LEV leverage; LIQ investment in other liquid assets; CFLOW cash flows; ZSCORE the probability of financial distress.

Variable	Mean	Std. Dev.	Median	Perc 10	Perc 90
CASH₁	0.0714	0.0843	0.0405	0.0054	0.1867
CASH₂	0.0880	0.1247	0.0422	0.0054	0.2295
AQ_DD	0.0144	0.0154	0.0088	0.0011	0.0362
GROWP	1.2179	0.7434	1.0221	0.7008	1.9435
SIZE	10.4024	1.6491	10.1297	8.4858	12.8539
LTDEBT	0.2919	0.2248	0.2415	0.0240	0.6359
BANKD	0.3680	0.2215	0.3647	0.0417	0.6738
RSPREAD	0.0141	0.0358	0.0120	-0.0272	0.0609
LEV	0.4904	0.1734	0.5025	0.2373	0.7222
LIQ	0.0512	0.1510	0.0387	-0.1072	0.2519
CFLOW	0.1922	0.1942	0.1222	0.0420	0.4100
ZSCORE	0.3569	0.1682	0.3403	0.1520	0.5670

Table III: Regression of current cash flows on lagged cash flows and net income

For each quintile of AQ_DD, we have regressed current cash flows on lagged cash flows and net income, controlling by firm effects. L.CFLOW is the lagged cash flow and L.NI is the lagged net income.

	Q1	Q2	Q3	Q4	Q5
L.CFLOW	-0.9323*** (-5.90)	-0.3196** (-2.16)	-0.3656*** (-2.76)	-0.3913** (-2.42)	-0.2372** (-2.20)
L.NI	1.1462** (2.29)	2.0762*** (4.28)	0.3112 (0.79)	0.7422** (2.26)	0.1137 (0.37)
C	0.009 (0.52)	-0.0368** (-2.22)	0.019 (1.41)	0.0174 (1.47)	0.0493*** (4.04)
R²	0.3603	0.2252	0.1103	0.0995	0.0586

***, **, * denotes significance at the 1%, 5%, and 10% level respectively.

Table IV: Regressions of corporate cash holdings on accruals quality (I)

In Column 1 the dependent variable is $CASH_{1t}$ and in Column 2 $CASH_{2t}$. AQ_DD is an inverse proxy of accruals quality; GROWP measures growth options; SIZE firm size; LTDEBT long term leverage; BANKD bank debt; RSPREAD opportunity cost of keeping cash; LEV leverage; LIQ investment in other liquid assets; CFLOW cash flows; ZSCORE the probability of financial distress; DIV is a dummy variable which takes value one if firms distribute dividends and zero otherwise. Both regressions have been estimated using two-stage GMM estimator.

	1	2
CASH_{1t-1}	0.2494*** (5.67)	
CASH_{2t-1}		0.3257*** (7.16)
AQ_DD	0.2510* (1.78)	0.5145*** (2.98)
GROWP	-0.0015 (-0.33)	-0.0028 (-0.92)
SIZE	0.0033 (0.61)	0.0050 (0.62)
LTDEBT	0.1437*** (4.75)	0.1783*** (3.31)
BANKD	-0.1035*** (-6.15)	-0.1058*** (-4.36)
RSPREAD	-0.0370 (-0.28)	-0.0994 (-0.71)
LEV	-0.2403*** (-5.49)	-0.2625*** (-4.14)
LIQ	-0.4082*** (-5.3)	-0.4809*** (-4.79)
CFLOW	0.0604*** (3.35)	0.1037*** (3.44)
ZSCORE	-0.0058 (-0.13)	0.0504 (0.83)
DIV	0.0041** (2.16)	0.0039 (1.46)
C	0.0013 (1.33)	0.0028** (2.5)
Sargan	51.85 (204)	46.40 (204)
m_2	0.77	0.86
Obs.	520	520

z statistic in brackets.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Sargan Test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments such as Chi-squared. Degrees of freedom in brackets.

m_2 is a test for second-order serial autocorrelation in residuals in first differences, distributed asymptotically as $N(0,1)$ under null hypothesis of no serial correlation.

Table V: Regressions of corporate cash holdings on accruals quality (II)

In Columns 1, 2 and 3 the dependent variable is CASH₁. In Columns 4, 5 and 6 the dependent variable is CASH₂. AQ_BS, AQ_MARGIN and AQ_sdDD are alternative proxies to measure accruals quality; GROWP measures growth options; SIZE firm size; LTDEBT long term leverage; BANKD bank debt; RSPREAD opportunity cost of keeping cash; LEV leverage; LIQ investment in other liquid assets; CFLOW cash flows; ZSCORE the probability of financial distress; DIV is a dummy variable which takes value one if firms distribute dividends and zero otherwise. All regressions have been estimated using two-stage GMM estimator.

	1	2	3	4	5	6
CASH_{1t-1}	0.2647*** (5.39)	0.2549*** (6.25)	0.3444*** (11.23)			
CASH_{2t-1}				0.4085*** (7.32)	0.2761*** (6.4)	0.4190*** (15.76)
AQ_BS	0.3758*** (3.61)			0.7163*** (3.66)		
AQ_MARGIN		0.1920*** (3.84)			0.1347** (2.01)	
AQ_sdDD			1.1291*** (4.63)			1.7156*** (3.95)
GROWP	-0.0015 (-0.57)	0.0028 (0.71)	-0.0033* (-1.63)	-0.0038 (-0.82)	-0.0085 (-1.34)	-0.0046 (-1.47)
SIZE	0.0045 (0.78)	-0.0129** (-1.99)	0.0152** (1.98)	0.0179*** (2.56)	-0.0024 (-0.21)	0.0278*** (3.26)
LTDEBT	0.0979*** (2.97)	0.1141*** (2.43)	0.1585*** (8.12)	0.1497*** (3.66)	0.1728** (1.96)	0.2244*** (10.61)
BANKD	-0.0896*** (-5.57)	-0.0978*** (-4.94)	-0.1447*** (-7.18)	-0.0950*** (-4.4)	-0.0946*** (-4.01)	-0.1835*** (-7.93)
RSPREAD	-0.0877 (-0.81)	-0.0094 (-0.07)	-0.0585 (-0.81)	-0.0867 (-0.6)	0.0530 (0.27)	-0.1819* (-1.64)
LEV	-0.2349*** (-5.68)	-0.1997*** (-5.04)	-0.1856*** (-3.85)	-0.2987*** (-4.76)	-0.2980*** (-3.55)	-0.3536*** (-5.17)
LIQ	-0.3281*** (-6.11)	-0.2934*** (-3.76)	-0.5334*** (-15.01)	-0.4403*** (-5.25)	-0.4367*** (-3.35)	-0.7934*** (-19.05)
CFLOW	0.0658*** (5.04)	0.0175 (0.59)	0.0514** (2.52)	0.1175*** (3.31)	0.1119*** (2.75)	0.1349*** (4.07)
ZSCORE	-0.0086 (-0.2)	0.0153 (0.28)	0.0752* (1.86)	0.0029 (0.05)	-0.0281 (-0.39)	0.1068* (1.79)
DIV	0.0007 (0.35)	0.0012 (0.49)	0.0050** (2.18)	-0.0019 (-0.71)	-0.0002 (-0.09)	0.0009 (0.3)
C	0.0017** (2.32)	-0.0066** (-2.19)	-0.0004 (-0.37)	0.0019* (1.79)	-0.0063 (-1.36)	-0.0009 (-0.53)
Sargan	46.53 (204)	43.37 (248)	51.77 (103)	46.75 (204)	40.17 (248)	50.41 (103)
m ₂	0.64	0.07	0.83	0.91	0.16	1.06
Obs.	520	650	260	520	650	260

z statistic in brackets.

* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

Sargan Test is a test of over-identifying restrictions distributed asymptotically under null hypothesis of validity of instruments such as Chi-squared. Degrees of freedom in brackets.

m₂ is a test for second-order serial autocorrelation in residuals in first differences, distributed asymptotically as N(0,1) under null hypothesis of no serial correlation.