Accruals Quality, Financial Constraints and Corporate Cash Holdings

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Abstract

This paper examines the impact of accruals quality on corporate cash holdings of a large sample of 6,501 observations of French firms listed in Euronext Paris over the period 2000-2015. The results show that cash holdings decrease with accruals quality, suggesting that firms tend to increase their cash reserves in the presence of information asymmetry driven, in particular, by low quality of accounting quality. Results also report that this negative effect is more pronounced in financially constrained firms than in financially unconstrained ones. This indicates that low reporting quality drives higher cash holdings when firms are, in addition, financially constrained, which emphasizes the importance of information asymmetry for corporate cash holdings.

Overall, our conclusion is consistent with the precautionary motive for cash holdings. We also find support for the notion that corporate transparency is a key factor in explaining a firm's cash management policy, and in general, corporate policies.

***Keywords**:* Accounting quality; Accruals quality; Cash holdings; Information asymmetry, Financial constraints

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1. Introduction

According to the Banque de France, cash holdings of non-financial French firms have progressed from €200 billion to €380 billion, between 2008 and the first quarter 2014, representing 10% to 18% of GDP of the country. This phenomenon of piling up cash subsequently to the 2008 financial crisis is not surprising, since European firms in general seem to adopt a conservative investment policy and to hoard precautionary cash as a buffer against uncertainty and unexpected liquidity shocks.[1]

In a frictionless market, i.e. a financial market without transaction costs and no impediments to financing, the level of cash holdings is irrelevant. However, the pecking order theory suggests that internal funds are the most favored source of financing because they minimize the firm exposure to the imperfections of capital markets (Myers and Majluf 1984). The presence of market imperfections, notably informational asymmetries between managers and investors, makes firms willing to hold more cash for precautionary motive as a way to avoid transaction costs and underinvestment (Keynes, 1936). A large body of literature in accounting and finance shows that information asymmetry adversely affects the cost of external financing (Amihud and Mendelson, 1986; Brennan and Subrahmanyam, 1996; Leuz and Verrecchia, 2000; Easley et al., 2002; Easley and O'Hara, 2004) and thereby increases cash holdings (Dittmar et al., 2003, Ozkan and Ozkan, 2004).

In the agency theoretic framework, the availability of cash exceeding a firm's needs can exacerbate the managerial agency problem. This excess cash is, indeed, likely to be diverted in empire building to increase the size and the scope of managers' power and influence, and thereby their private benefits (Jensen, 1986; Myers and Rajan, 1998). This may create potentially high agency costs associated with cash holdings. These costs tend to be more severe in French civil law countries due to the weak protection of investors' rights in such settings (La Porta et al., 1998). This problem of agency costs can be aggravated by the presence of information asymmetry.

Recent empirical research has focused on the role of accounting quality as a measure of information asymmetry. Notably, Bahttacharya et al. (2003) and Francis et al. (2004, 2005) show that higher accounting quality reduces information asymmetry and consequently reduces

[1] See, Stephen Filder, "Firms' Cash Hoarding Stunts Europe", *The Wall Street Journal*, March 22, 2012.

the cost of external financing. Our study extends this line of research by examining the effect of accruals quality –that gauges accounting quality−on corporate cash holdings.

There is an association between accounting quality, or more generally, financial reporting quality, and the reduction of information asymmetry between firms and external suppliers of capital in relation to investment efficiency (Biddle et al., 2009; Shin et al., 2017). In fact, financial reporting conveys information about the expected cash flows that helps present and potential investors in making rational investment decisions. Financial reporting of high quality contributes in reducing information asymmetry between managers and investors, leading to lower adverse selection and external financing costs, and thus to more efficient investment. To the extent that lesser information asymmetry also helps mitigating agency problems, a better information environment of firms with high-quality financial reporting may lower the cost of monitoring exerted by shareholders and thus improve project selection and reduce the need to hold precautionary cash (Garcia-Teruel et al., 2009). From a different perspective, Koo et al. (2017) find that higher quality reporting is associated with higher dividends, meaning that firms having higher accounting quality tend to retain lower cash holdings.

A number of empirical studies use the quality of earning as a proxy for the accuracy of a firm's financial reporting (Francis et al. 2005; Ball and Shivakumar, 2008; Gomariz and Ballesta, 2014). Poor earning quality causes internal and external uncertainties that make it highly important for a firm to hold cash reserves at a higher level than the norm. The accruals reported in the financial statement especially on the balance sheet, are an important component in the computation of cash flow. Several studies as Opler et al. (1999) and Mikkelson and Partch (2003) suggested that firms hedge against future cash flow volatility by increasing the precautionary level of cash balances when cash flow uncertainty is higher. Poor earning quality aggravates information asymmetry between stakeholders and managers. Indeed a major determinant of information asymmetry is the accuracy of a firm's financial reporting (Sun et al., 2012) or namely nonoperational decision (Kurt, 2017). The information asymmetry generates a misevaluation of a firm's securities which makes it more expensive and harder for a firm to hoard cash for operational and investment needs (Nanda and Narayana, 1999) and makes it more expensive for companies to raise external capital (Myers and Majluf, 1984). Link et al. (2013) find that firms use accruals quality to signal positive prospects and increase their stocks price in the short run in a manner that facilitates raising external funds. Gao and Jia (2016) report that low accounting quality, reflected in internal control weaknesses, endangers firm resources. Therefore, we argue that poor earning quality drives information

asymmetry that makes the external funding more expensive, thus increasing firms' likelihood to hold more cash.

We also propose to investigate the role that financial constraints play in the relationship between accruals quality and corporate cash holdings. Financial constraint measures a firm's ability to access external funding. Korajczyk and Levy (2003) define financially constrained firms as those that face severe agency and transaction costs when accessing capital markets. Fazzari et al. (1988) argue that "the relation between asymmetric information in capital markets and financial constraints on investment spending cannot be rejected". Financial frictions are important for financially constrained firms which have difficulty in raising funds for their investments (Duchin et al., 2010). As a result, financially constrained firms increase the level of cash reserve so as to be able to finance good investment opportunities that arise. Financially unconstrained firms, however, would have easy access to external capital market for their profitable investment opportunities.

We argue that the incentive for holding cash in firms with low accounting quality should be greater when the high costs of external financing increase financial constraints for the firms. In this respect, Faulkender and Wang (2006) argue that cash reserves are more valuable for financially constrained firms that are often restricted to available internal funds when undertaking profitable projects. The presence of information asymmetry makes that the cost of external finance increases more than the cost of internal finance. We thus expect that firms with greater information asymmetry which is notably driven by lower accounting quality to hold more cash reserve because external capital costs are much higher for them.

Our study contributes to the literature in many ways. To the best of our knowledge, it is the first work, to investigate the link between the quality of accruals and cash holdings in the French equity markets. Since the French context is generally characterized by weak investor protection and high concentration of ownership (La Porta et al., 1998), we can suppose that French firms present lower accounting quality (Lang et al., 2003; Leuz et al., 2003) leading them to hold more cash . As sustained by Harford et al. (2008) free cash flow can be wasted when shareholders' rights are not well protected. Accordingly, managers of firms where shareholders are not sufficiently protected can take advantage of the resources under their control with relative immunity. Such behavior is aggravated in countries where investor protection is low, such as the French context. Moreover, we use a more accurate measure of accruals' quality: the Jones-model performance-matched discretionary accruals suggested by

Kothari et al. (2005). Besides, as far as we know, nor prior study investigates the role that financial constraints play in the relationship between accruals quality and corporate cash holdings.

The rest of the paper in organized as following. Section 2 describes data. Section 3 presents univariate tests. Section 4 reports regressions' results of the multivariate analysis. Section 5 summarizes and concludes the paper.

2. Data

2.1. Sample

Our sample covers all listed firms on Euronext Paris during the period 2000-2015, excluding financial firms (SIC codes 6000-6999) since they have specific regulations as well as utility firms (SIC codes (4900-4999) since they are subject to regulatory supervision by the State. In order to avoid any survivorship bias, we include both active and dead firms in our sample.

We use Thomson Financial database for collecting accounting and financial data. Consistent with prior discretionary accruals research, we exclude firm-year observations that do not have sufficient data to estimate discretionary accruals. In particular, we need a minimum of eight observations in any industry in any given year. The screening process results in a final sample of 6,501 firm-year observations.

2.2. Variables measurement

2.2.1. Cash holdings

The dependent variable, cash holdings, is measured as cash and short-term investments over total book assets (Opler et al., 1999).

2.2.2. Accruals quality

To estimate the discretionary accruals model, we first calculate total accruals directly from the cash flow statement as advocated by Hribar and Collins (2002) as follows:

$$TACC = NIBE - CFO$$

Where $TACC$ = the total accrual, $NIBE$ = net income before extraordinary items and CFO = cash flows from operations.

Next, the following Jones model discretionary accruals are estimated cross-sectionally each year, using all firm-year observations belonging to the same industry, where industries are defined in Table 1.

$$\frac{TACC_{it}}{ASSETS_{it-1}} = \beta_0 + \beta_1 \frac{1}{ASSETS_{it-1}} + \beta_2 \frac{\Delta SALES_{it}}{ASSETS_{it-1}} + \beta_3 \frac{PPE_{it}}{ASSETS_{it-1}} + \varepsilon_{it} \qquad (1)$$

where $\Delta SALES_{it}$ is change in sales, $ASSETS_{it-1}$ is lagged total assets, and PPE_{it} is net property, plant and equipment. We use residuals from the annual cross-sectional industry regression model in (1) as the Jones model discretionary accruals.

Following the methodology of Kothari et al. (2005), we match each firm-year observation with another from the same industry and the same year with the closest lagged return on assets, ROA_{it-1} (net income divided by total assets). The Jones-model performance matched discretionary accruals for firm *i* in year *t* as the Jones-model discretionary accruals in year *t* minus the matched firm's Jones-model discretionary accruals for year *t*. Therefore, the absolute value of the Jones-model performance-matched discretionary accruals for each firm-year observation is an inverse measure of accruals quality ($|ACCD\_K|$) : the higher $|ACCD\_K|$, the lower accruals quality.

Among the various discretionary accruals models, Kothari et al. (2005) report that the performance-matched Jones model perform the best, and this for at least two reasons First, this approach does not impose a formal model of accruals as a function of performance.[2] Second, performance-matched discretionary accruals are well specified and powerful since they are based on detailed simulation evidence on the properties of concurrent measures of discretionary accruals over random and stratified-random samples, and by examining the properties of discretionary accruals models over multi-year horizons and their sensitivity to sample size.

2.2.3. Control variables

A number of firm characteristics are included in the cash model as determinants of corporate cash holdings.

[2] See Fields et al. (2001) for a discussion of this issue.

(i) Market-to-book ratio (MTB). This variable is a proxy for investment opportunities. According to the pecking order theory, investment opportunities positively affect cash levels (Myers and Majluf, 1984). Since firms with high investment opportunities are likely to have larger information asymmetry, these firms may incur higher external financing costs, resulting in greater cash holdings (Bates et al., 2009; Ferreira et Vilela, 2004). Moreover, firms having more investment opportunities should generally hold more cash for precautionary use (Opler et al, 1999).

(ii) Firm size (SIZE). This variable is measured as the natural logarithm of book value of assets. According to Opler et al. (1999), the firm size negatively affects corporate cash holdings. Indeed, smaller firms have more information asymmetry implying high costs of external finance and thus higher propensity to hoard cash. Furthermore, this relation is based on the existence of 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 (Baumol, 1952; Miller and Orr, 1966).

(iii) Cash flows (CFO). This variable is measured as cash flow from operation over total book assets. We expect cash flows to be negatively related to cash holdings since cash flows represent a source of corporate liquidity that can substitute for cash (Kim et al., 1998). However, the hierarchy theory suggests that firms are more willing to retain internally generated funds because of the market imperfections (Myers and Majluf, 1984). Since cash flows represent a source of reserve of cash, they are expected to be positively related to corporate cash holdings.

(iv) Capital expenditure (Capex). This variable represents long-term expenses in the current year (which are funds used by the firm to acquire or upgrade physical assets). It is measured as total capital expenditure over total book assets. The pecking order theory suggests a negative relationship between Capex and cash holdings, since capital expenses consume the firm's cash reserves (Bates et al. 2009). However, the trade-off theory suggests a positive relationship since firms engaging in higher capital expenditure are expected to generate more cash.

(v) Net working capital (WCNET). This variable is defined as working capital minus cash and short term investment over total over total book assets. Net working capital can be considered as a form of maintenance of liquidity and thus a substitute for cash holdings because it can easily be converted to cash when transaction costs are not severe. A negative relation is expected between net working capital and the level of cash.

(vi) Debt financing (Debt). This variable is measured as total debt over total book assets. The pecking order theory of Myers and Majluf (1984) suggests that firms have a preference of their sources of financing, first preferring internal financing, and then debt, lastly raising equity, implying that cash declines when leverage rises. Another argument in relation to the monitoring role of financial institutions suggests that firms with high level of debt are less able to stockpile cash because they are better monitored by the debtors (Ferreira and Vilela, 2004). Moreover, firms having more debt can signal the lack of internal funds. We thus hypothesize a negative relation between debt and cash holdings.

(vii) Research and development expenses (R&D). This variable is measured as the ratio R&D to sales. Since investments in R&D are associated with more uncertainties and information asymmetries, one would expect firms with higher R&D to hoard more cash for precautionary motive (Opler et al., 1999; Foley et al, 2007, Bates et al. 2009).

(viii) Div_dummy is a dummy variable which take the value of zero if firms pay dividends and zero otherwise. Firms that pay dividends are expected to hold less cash holdings.

All variables are winsorised to the 1st and 99th percentiles

2.3. Descriptive statistics

Table 1 Panel A reports the frequency of firms by industry. Table 1 Panel B reports the mean and median statistics of cash holdings across industries. Results show that cash holding is sensitive to industry variations. “Pharmaceuticals” and “Computers” industries exhibit the highest levels of cash. This result can be interpreted by the fact that these industries have higher R&D expenses which are investments where information asymmetries are very important. “Food” and “Retail” industries exhibit the lowest levels of cash.

Table 1: Industry classification and summary statistics of cash holdings

This table provides the industry classification details and the summary statistics of cash holdings across industry. Panel A presents the industry classification details, the frequency and the percentage of firm-year observations by industry. Panel B presents the mean and median values of cash holdings within each industry except financial and utility industries.

Panel A : Industry Classification			
Industry	SIC code	Frequency	Percentage
Mining, construction	1000-1299 or 1400-1999	184	2.83
Food	2000-2111	366	5.63
Textiles, printing.	2200-2799	402	6.18
Chemicals	2800-2824 or 2840-2899	228	3.51
Pharmaceuticals	2830-2836	187	2.88
Extractive Industries.	2900-2999 or 1300-1399	109	1.68
Durable	3000-3569 or 3580-3669 or 3680-3999	1626	25.01
Computers	7370-7379 or 3570-3579 or 3670-3679	1337	20.57
Transportation	4000-4899	380	5.85
Retail	5000-5999	697	10.72
Services	7000-7369 or 7380-8999	985	15.15

Panel B : Statistics of cash within industry		
Industry	Mean	Median
Mining, construction	0.154	0.129
Food	0.099	0.054
Textiles, printing.	0.121	0.078
Chemicals	0.132	0.092
Pharmaceuticals	0.274	0.145
Extractive Industries.	0.133	0.100
Durable	0.141	0.106
Computers	0.194	0.153
Transportation	0.132	0.098
Retail	0.103	0.085
Services	0.162	0.111

The descriptive statistics is presented in Table 2. Results show that the Cash ratio has a mean of 15.2 per cent and a median of 10.8 per cent. This suggests that liquid assets of French firms represent an important component of the firm assets.

Table 2: Descriptive statistics

Descriptive statistics on key variables for our sample of firm years from 2000-2015 sample of French-based listed firms on Euronext Paris. The definition of variables is illustrated in the description variables section. All variables are winsorized at 1% and 99% level.

	Mean	Std.	P25	Median	P75	Min	Max
Cash	0.152	0.145	0.056	0.108	0.198	0.000	0.972
$\|ACCD\_K\|$	0.011	0.04	0.000	0.001	0.004	0.000	0.728
MTB	2.030	1.947	0.886	1.492	2.485	0.000	15.555
Size	12,402	2.306	10.670	11.988	13.824	7.156	19.044
CFO	0.053	0.114	0.020	0,064	0.105	-1.392	0.892
WCNET	0.0207	0.163	-0.089	0,019	0,119	-0.700	0.763
Debt	0.205	0.150	0.079	0.191	0.306	0.000	0.798
Cexp	0.044	0.055	0.014	0.031	0.056	0.000	0.235
R&D/Sales	0.123	1.762	0.000	0.000	0.007	0.000	72.236
Div_Dummy	0.631	0.482	0.000	1	1	0	1

3. Univariate tests

Table 3 presents univariate tests of firm characteristics by accruals' quality as measured by the Jones-model performance-matched discretionary accruals. The quartiles are constructed by year. In doing so, we are interested in whether the characteristics of companies which are in the highest accruals' quality (First quartile) differ from those which are in the lowest accruals' quality (Fourth quartile). To test this conjecture, we use a t-test.

Except two variables (WCNET and Capex), characteristics of firms in the lowest and highest accruals quality are statistically different at 1% level. The mean values of accruals quality for firms in the first quartile and in the fourth quartile are 0.0002 and 0.0401, respectively and the difference is significant at 1%. The mean cash ratio of firms in lowest accruals quality (fourth quartile) is 0.1856 and the mean cash ratio of those in the highest accruals quality (first quartile) is 0.1328, and the difference is significant at 1%. The market-to-book (MTB) ratio increases monotonically with accruals quality. Inversely, the result holds for the debt ratio.

Firms in the first three quartiles of accruals quality are similar in size, but firms in the fourth quartile are substantially smaller. The average ratio R&D-to-sales increase monotonically with accruals quality. In contrast, payouts to shareholders increase monotonically across quartiles of accruals quality: the mean values of payouts for firms in the first quartile and in the fourth quartile are 0.7058 and 0.4843 respectively and the difference is significant at 1%. The mean payout to shareholders in the lowest accruals quality (fourth quartile) is 0.4843 and the mean payout to shareholders of those in the highest accruals quality (first quartile) is 0.7058, and the difference is significant at 1%.

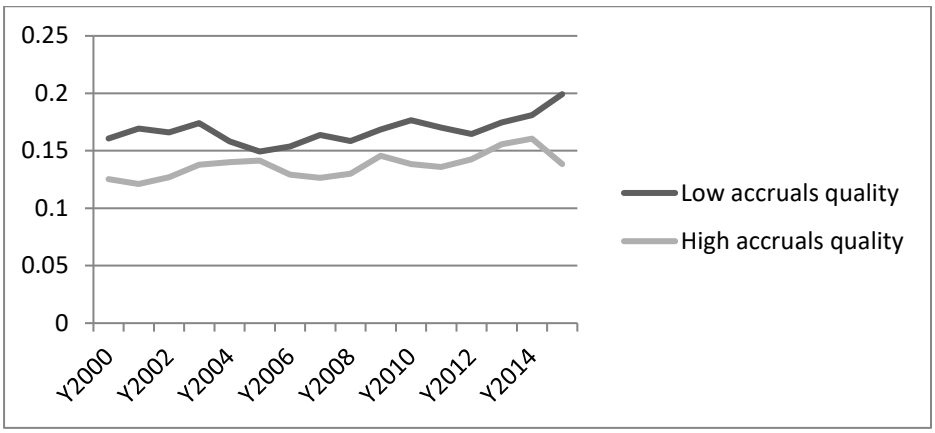
Table 3: Firm characteristics by accruals quality quartiles

Univariate comparaison of means of measures of firm characteristics of 6,501 firm years from 2000-2015 sample of French listed firms on Euronext Paris. The definition of variables is illustrated in the description variables section. Quartiles for $|ACCD\_K|$ are determined each year. The *t*-statistics is a difference of means test from to the first to the fourth quartile. Each quartile contains approximately 1,625 firm years.

Variable	First quartile	Second quartile	Third quartile	Fourth quartile	*t*-statistic (*p*-value)
$\|ACCD\_K\|$	0.0002	0.0009	0.0027	0.0401	-40.05*** (0.000)
Cash	0.1328	0.1427	0.1432	0.1856	-10.29*** (0.000)
MTB	2.0255	2.0668	2.3321	6.5979	-3.05*** (0.000)
Size	12.6699	12.5405	12.4537	11.9457	8.65*** (0.000)
CFO	0.0636	0.0618	0.0629	0.0243	7.51*** (0.000)
WCNET	0.0191	0.0151	0.0243	0.0243	-0.88 (0.378)
Debt	0.2226	0.2109	0.2043	0.1828	7.29*** (0.000)
Cexp	0.0438	0.0426	0.0465	0.0430	0.47 (0.640)
R&D/sales	0.0148	0.0189	0.0243	0.4340	-4.73*** (0.000)
div_dummy	0.7058	0.6830	0.6543	0.4843	12.95*** (0.000)

Figure 1 illustrate the average cash holdings for firms with higher accruals quality (first quartile of $|ACC\_K|$) and for firms with lower accruals quality (fourth quartile of $|ACC\_K|$) from 2000 to 2015. This figure indicates a significant difference in cash holdings policies between these two groups of firms. In particular, firms with higher accruals' quality persistently hold less cash compared to firms with lower accruals quality over the study period.

Figure 1. Average annual cash holdings for firms with high acrruals quality and firms with low accruals quality



4. Regression results

4.1. Effect of accruals quality on the level of cash holdings

Table 4 presents panel regressions estimating the effect of accruals quality on cash holdings of 6,501 firm-year observations with 741 unique firms over the period 2000-2015. Column (1) reports estimates using the method presented in Fama and MacBeth (1973). Under this approach, we estimate cross-sectional regressions of yearly cash holdings of firms, and the independents variables. The Fama-MacBeth model treats each year as independent cross-section. As suggested by Opler et al. (1999), an advantage of the Fama-MacBeth procedure is that it eliminates the problem of serial correlation in the residuals of a time-series cross-sectional regression.

The positive coefficient of the variable $|ACC\_K|$ indicates that corporate cash holdings increase significantly with poor accruals quality. This result supports the hypothesis that firms with poorer accruals quality tend to hold more cash. This result confirms the findings of Garcia-Teruel et al. (2009) and Sun et al. (2012).

We also find that cash holdings decrease significantly with capital expenditures, net working capital and debt ratio, which is consistent with the results of Opler et al. (1999) and Sun et al. (2012). Findings also show that corporate cash holdings increase significantly with R&D to sales and Market-to-book.

We present three additional regression estimates in Table 5. In column (2), we use a time series cross-sectional regression with year dummies. In column (3), we use a time-series cross-sectional regression with year dummies where the variables are adjusted for industry, using dummy variables as defined in Table 1 panel A. The results of these regressions lead to the same results as the Fama-MacBeth regressions, but they have less absolute value *t*-statistics (except for the coefficient of MB and the coefficient of size for regression with year dummy). In column (4), we use a fixed-effects regression. Results show again a negative effect of accruals quality on the level of cash. As for control variables, results remains unchanged except for three variables. First, the variable CFO has a significant positive coefficient. Second, the coefficient of the variable R&D to sales is no more statistically significant. Third, Div_dummy has a significant positive coefficient.

Table 4: Regression estimation of the effect of accruals quality on cash holdings.

The dependent variable in all regressions is the ratio of cash and short term investment to book value of total assets. The definition of variables is illustrated in the description variables section. Column (1) reports results using the Fama and MacBeth procedure. Columns (2) and (3) present respectively the results of time series cross-sectional regression estimation with year dummies, and time series cross-sectional regression estimation with year and industry dummies. Column (4) reports the results of fixed-effects regression.

Independent Variable	Fama-MacBeth model (1)	Year dummies (2)	Year and industry dummies (3)	Fixed-effects regression (4)
Intercept	0.314	0.319	0.295	0.271
	(26.17)	(12.56)	(10.26)	(9.69)
$\|ACCD\_K\|$	0.444	0.368	0.345	0.157
	(3.51)	(3.51)	(3.84)	(5.50)
Cexp_ta	-0.261	-0.308	-0.282	-0.106
	(-5.16)	(-3.78)	(-3.66)	(-4.52)
CFO	0.007	0.061	0.055	0.145
	(0.17)	(1.88)	(1.79)	(14.27)
R&D/sales	0.055	0.014	0.013	0.0001
	(5.11)	(2.37)	(2.58)	(0.24)
MB	0.010	0.010	0.009	0.002
	(4.74)	(5.22)	(4.75)	(3.82)
WCNETnet	-0.134	-0.127	-0.125	-0.104
	(-9.36)	(-5.66)	(-5.14)	(-10.73)
Debt	-0.252	-0.063	-0.059	-0.056
	(-10.34)	(-4.84)	(-4.46)	(-15.92)
Div_dummy	0.006	0.008	0.013	0.012
	(1.07)	(1.00)	(1.58)	(3.74)
Size	-0.009	-0.013	-0.012	-0.009
	(-6.94)	(-7.28)	(-6.63)	(-4.16)
Adj. R^2	0.268	0.227	0.162	0.06
N	16 groups	6,501	6,501	6,501

4.2. Accruals quality, financial constraints and cash holdings

In the previous section, we show that cash holdings increase in firms having low reporting quality (i.e., high discretionary accruals) because of the presence of higher information asymmetry in these firms. Since greater information asymmetry is likely to be associated with higher costs of external finance and thus with more severe financial constraints, one would expect that cash holdings in firms with low reporting quality are higher in firms that are financially constrained than in firms that are financially unconstrained.

4.2.1. Financial Constraints Criteria

In the corporate finance literature, there is no consensus on the best proxy to classify financial constraint firms versus unconstraint firms. Denis and Sibilkov (2010) propose different measures of the firm's level of financial constraints that capture sufficiency of funding, access to external markets and financial condition. In our study, we use four of the most recently used financial constraints measures: firm size (sales adjusted to 1999 Euros), dividend payout ratio, KZ index (Kaplan and Zingales, 1997) WW index (Whited and Wu, 2006).

(i) Firm size: The empirical research shows that larger firms have lower information asymmetry, which makes them less likely to face severe financial constraints (Kaplan and Zingales, 1997; Whited and Wu, 2006). This variable is measured by total sales (in thousands of euros). Firms are grouped as financially constrained for sales less than the 30th percentile value, and are as financially unconstrained for sales higher than the 70th percentile value.

(ii) Payout ratio: Generally, financially constrained firms have difficulties to distribute dividends to their shareholders (e.g. Almeida and Campello, 2010; Fazzari et al., 1988). Accordingly, we divide the sample into two groups of firms: those that do not pay dividends are classified as financially constrained and those that distribute dividends are classified as financially unconstrained.

(iii) KZ index: As used by Lamont, et al. (2001), the Kaplan-Zingales index is given by,

$$KZ_{it} = -1.001909CFO_{it} + 3.139193LTD_{it} - 39.36780DIV_{it} - 1.314759CASH_{it} + 0.2826359Q_{it},$$

Where $\mathrm{CFO_{it}}$ is measured as cash flow from operation over total book assets, $\mathrm{LTD_{it}}$ is long term debt over total book assets, $\mathrm{DIV_{it}}$ is the ratio of total dividends to assets and $\mathrm{Q_{it}}$ is Tobin's *q*. The denominator of Tobin's *q* is the book value of total assets. The numerator is the book value of total assets minus the book value of equity minus balance-sheet deferred taxes plus the market value of equity.

(iv) WW index: The Whited and Wu (2006) index is developed as the following:

$$WW_{it} = -0.091CFO_{it} - 0.062DIVPOS_{it} + 0.021TLTD_{it} - 0.044LNTA_{it} + 0.102ISG_{it} - 0.035SG_{it}$$

Where CFO_{it} is the ratio of cash flow to total assets; $DIVPOS_{it}$ is an indicator that takes the value of one if the firm pays dividends; $TLTD_{it}$ is the ratio of the long-term debt to total assets; $LNTA_{it}$ is the natural log of total assets, ISG_{it} is the firm's industry sales growth; SG_{it} is firm sales growth.

We rank firms by their KZ (WW) values each calendar year and divide them into two groups: The higher these values are, the more financially constrained firms are.

4.2.2. Descriptive statistics for unconstrained firms and constrained firms

Table 5 presents the mean firm characteristics by financial constrained categories under each classification. The cross-sample differences between constrained and unconstrained firms are in line with prior studies. The mean value of cash ratio of constrained firms is 20.7% (17.1%) and the mean cash ratio of those unconstrained firms is 11.6% (13.8%) based on the size classification (payout classification).[3] When we use KZ index (WW index), the mean value of cash of constrained firms is 21.9% (16.5%) and the mean cash ratio of those unconstrained firms is 8.8% (12.3%).

The results suggest that financially constrained firms tend to have higher discretionary accruals, higher R&D and higher Market-to-book ratio than unconstrained firms. Constrained firms have less cash flow from operations than unconstrained firms. Constrained firms seem to invest more in capital expenditures.

In sum, the results indicate that constrained firms present higher discretionary accruals than unconstrained firms. These findings are important because high discretionary accruals is a proxy for high information asymmetry, meaning that financially constrained firms with low reporting quality tend to hold more cash than their financially unconstrained peers.

[3] In the study of Ginglinger and Saddour (2007), on average French firms hold 18.4% of their assets for financially constrained firms based on the size criterion, and 11.2% for unconstrained firms.

Table 5 : Descriptive statistics for unconstrained firms and constrained firms.

This table provides means on key variables for our sample firm-year observations across groups of financially constrained and unconstrained firms. We use letter s (UC) for unconstrained firms and letter (C) for constrained firms. Unconstrained firms (Sales) are those in the top three deciles of sales distribution. Constrained firms (Sales) are those in bottom of three deciles of sale distribution. Unconstrained firms (Payout) pay dividends. Constrained firms (Payout) not pay dividends to their shareholders. Panel B presents the classification of constrained and unconstrained firms using KZ and WW indexes. The definition of variables is illustrated in the description variables section. *t*-stat for mean difference are reported. Significance at 1%, 5% and 10% levels is respectively by ***, **, and *, respectively.

Panel A	Sales		*t*-stat difference	Payout		*t*-stat difference
	UC.firms	C.firms		UC.firms	C.firms	
Cash	0.116	0.207	-18.35***	0.138	0.171	-9.16***
$\|ACCD\_K\|$	0.004	0.022	-12.19***	0.004	0.021	-17.28***
Cexp_ta	0.044	0.043	0.07	0.037	0.045	-4.13***
CFO	0.080	0.003	10.32***	0.078	0.005	15.19***
R&D/sales	0.016	0.367	-4.93***	0.013	0.290	-6.29***
WCNET	-0.033	-0.006	2.12**	0.023	-0.032	6.74***
MTB	2.062	2.253	-2.89***	1.994	2.086	-1.85*
Debt	0.262	0.217	1.31	0.216	0.253	-1.74*
Div_ta	0.021	0.017	1.16	-	-	-
Size	15.225	9.985	134.68***	13.187	10.993	41.71***
N	1951	1951		3980	2521	
Panel B	KZ index		*t*-stat difference	WW index		*t*-stat difference
	UC.firms	C.firms		UC.firms	C.firms	
Cash	0.088	0.219	-36.63***	0.123	0.165	-13.14***
$\|ACCD\_K\|$	0.004	0.006	-3.93***	0.003	0.006	-10.74***
Cexp_ta	0.037	0.049	-8.03***	0.038	0.042	-2.15**
CFO	0.051	0.048	1.25	0.033	0.077	-15.12***
R&D/sales	0.026	0.219	-4.35***	0.024	0.186	-3.78***
WCNET	0.034	-0.004	9.10***	0.003	-0.002	9.69***
MTB	2.162	2.728	-2.51***	1.988	3.513	-2.51**
Debt	0.137	0.323	-50.66***	0.202	0.257	-12.03***
Div_ta	0.026	0.004	12.73***	0.019	0.016	1.22
Size	12.505	12.138	6.32***	14.206	10.719	87.54***
N	3,224	3,377		3,224	3,377	

4.2.3. Regression results across groups of unconstrained and constrained firms

To investigate the impact of accruals quality on the level of cash holdings, we estimate the following regression (subscripts are omitted for simplicity):

$$Cash = \alpha + \beta_1.|ACCD\_K| + \beta_2.Z + FIXED\ EFFECTS + \varepsilon \qquad (2)$$

Where Cash is cash holdings divided by total assets, $|ACCD\_K|$ is the absolute value of the Jones-model performance-matched discretionary accruals which is a proxy for accruals quality, Z is a vector of control variables commonly used in cash holdings regressions discussed in sub-section 2.2 (Cexp_ta, CFO, R&D-to-sales, WCNET, Market-to-book, debt, div-dummy[4]), and FIXED EFFECTS denoted as a set of year and industry fixed effects, and ε is the error term.

We run this regression across financially constrained firms and financially unconstrained firms. Our focus in the analysis is the coefficient, β_1, which measures the sensitivity of cash holdings to accruals quality. A positive value indicates that firms with low accruals quality hold more cash than do firms with high accruals quality.

Panel A of table 6 report the results for the subsample of unconstrained firms (the largest 30%) and constrained firms (the smallest 30%) (Columns 1 and 2). First, there is a difference in the sensitivity of cash holdings to accruals quality. For unconstrained firms, the coefficient β_1 is not statistically different from zero, while for constrained firms it is positive and significant at 1% level. These results suggest that cash holdings increase significantly with absolute value of discretionary accruals when firms are financially constrained, meaning that cash holdings in firms with low reporting quality are higher in firms that are additionally financially constrained.

The results are quite different for the second classification based on the payout criterion (Columns 3 and 4). The coefficient β_1 is positive and statistically different from zero for unconstrained firms and constrained firms. For unconstrained firms, the coefficient of $|ACCD\_K|$ is 0.703. To assess economic significance, we calculate the one-standard-deviation impact of $|ACC\_K|$ by multiplying its coefficient estimate by its sample standard deviation. The coefficient estimate for the first regression implies that a one-standard-deviation increase of $|ACCD\_K|$ which is 1.322% for our sub-sample is associated with a cash increase of 0.9 cents per Euro of assets. Comparatively, the coefficient estimate for the second regression

[4] This variable is omitted when we use a classification of constrained firms and unconstrained firms based on payout criterion.

(constrained firms based on the payout criterion) implies that a one-standard-deviation increase of $|ACCD\_K|$ which is 6.148% for our sub-sample is associated with a cash increase of 1.63 cents per Euro of assets. Hence, $|ACCD\_K|$ is associated with both economically and statistically significant increase in cash holdings. Although $|ACCD\_K|$ is positively related to cash holdings for unconstrained firms, the coefficient estimates are not economically so important than for constrained firms. Constrained firms defined on the basis of payout criterion differ from constrained firms defined on the basis of the size criterion. The first group is by construction more heterogeneous in terms of the size. This group may contain firms that are large in terms of size and are unable to pay out dividends, and growth firms that choose deliberately not to distribute dividends to their shareholders.

The coefficient of the variable capital expenditure is negative and significant for all the regressions independently of the criterion of classification in constrained and unconstrained firms. However, the coefficient of the variable CFO is positive and significant only for unconstrained firms. This result confirms that there is a propensity of unconstrained firms to hoard some of their cash flows in the form of cash reserves[5]. Concerning R&D to sales, the coefficient associated with this variable is positive and significant for all regressions. However, the coefficient of R&D to sales for unconstrained firms is larger (0.454 for size group and 0.272 for payout group) and statistically significant. For constrained firms, the coefficient of R&D to sales is smaller (0.008 for size group and 0.009 for payout group). To assess economic significance, we calculate the one-standard-deviation impact of R&D to sales by multiplying its coefficient estimate by its sample standard deviation. The coefficient estimate for the first regression (unconstrained firms based on the size criterion) implies that a one-standard-deviation increase of R&D to sales which is 3.99% for our sub-sample is associated with a cash increase of 1.8 cents per Euro of assets. Comparatively, the coefficient estimate for the second regression (constrained firms based on the size criterion) implies that a one-standard-deviation increase of R&D to sales which is 314.8% for our sub-sample is associated with a cash increase of 2.5 cents per Euro of assets. Hence, R&D to sales is associated with both economically and statistically significant cash increase. As suggested by Opler et al. (1999), the "…cost of financial distress [is] to be larger for firms with high research and development (R&D) expenses, since R&D expenses are forms of investment where information asymmetries are

[5] This variable is omitted when we use a classification of constrained firms and unconstrained firms based on payout criterion.

most important". The financially constrained firms will hold more liquid assets. The coefficient of the variable Debt is negative and significant for unconstrained and constrained firms, which confirm the idea that firms which have more debt can signal the lack of internal funds.

Panel B of table 6 report the results for the subsamples using KZ (Columns 1 and 2) and WW (Columns 3 and 4) indexes as classification criterion. The results remain qualitatively the same.

Overall, these results confirm the idea that cash holdings in firms with low reporting quality are higher in firms that are financially constrained than in firms that are financially unconstrained. This can be explained by the notion that information asymmetry associated with low reporting quality is greater when firms additionally have high financial constraints.

Table 6: Regression estimates across groups of unconstrained and constrained firms

This table presents estimates across groups of financially unconstrained and constrained firms. We use letters (UC) for unconstrained firms and letter (C) for constrained firms. Unconstrained firms (Sales) are those in the top three deciles of sales distribution. Constrained firms (Sales) are those in bottom of three deciles of sales distribution. Unconstrained firms (Payout) pay dividends. Constrained firms (Payout) not pay dividends to their shareholders. Panel B presents the classification of constrained and unconstrained firms using KZ and WW indexes. The definition of variables is illustrated in the description variables section. All regressions are specified as OLS regressions with year and industry fixed effects. All *t*-statistics are corrected for heteroskedasticity using White's (1980) correction and are in parentheses. Significance at 1%, 5% and 10% levels is respectively by ***, **, and *, respectively.

Panel A	Sales		Payout	
	UC.firms	C.firms	UC.firms	C.firms
	(1)	(2)	(3)	(4)
Intercept	0.103***	0.178***	0.333***	0.298***
	(5.12)	(3.74)	(9.95)	(5.65)
$\|ACCD\_K\|$	0.081	0.298***	0.703**	0.267***
	(0.40)	(2.64)	(2.60)	(3.14)
Cexp_ta	-0.242**	-0.252**	-0.272***	-0.208**
	(-2.54)	(-2.48)	(-3.45)	(-2.60)
CFO	0.285***	0.020	0.206***	0.011
	(4.53)	(0.56)	(3.64)	(0.34)
R&D/sales	0.397**	0.008***	0.232***	0.009***
	(2.01)	(2.98)	(2.82)	(2.76)
WCNET	-0.154***	-0.079**	-0.139***	-0.049*
	(-4.42)	(-2.11)	(-4.65)	(-1.90)
MB	0.005*	0.009***	0.001	0.012***
	(1.79)	(2.92)	(0.86)	(4.20)
Debt	-0.109***	-0.034**	-0.245***	-0.024**
	(-4.97)	(-2.20)	(-5.36)	(-2.02)
Div_dummy	0.008	0.032*	-	-
	(0.85)	(1.75)		
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Ajust. R^2	0.263	0.243	0.255	0.253
N	1951	1951	3950	2441
Panel B	KZ Index		WW Index	
	UC.firms	C.firms	UC.firms	C.firms
	(1)	(2)	(3)	(4)
Intercept	0.076***	0.274***	0.128***	0.189***
	(5.52)	(10.87)	(6.11)	(5.82)
$\|ACCD\_K\|$	0.289	1.918***	0.609*	0.803**
	(1.43)	(5.25)	(1.87)	(2.45)
Cexp_ta	-0.055**	-0.409***	-0.229***	-0.207**
	(-2.05)	(-3.43)	(-2.63)	(-2.51)
CFO	0.106**	-0.026	0.205***	-0.043
	(2.33)	(-0.59)	(3.15)	(-0.95)
R&D/sales	0.054**	0.006**	0.150***	0.010***
	(2.41)	(2.06)	(9.18)	(2.87)
WCNET	-0.039***	-0.173***	-0.108***	-0.113***
	(-2.67)	(-4.09)	(-3.25)	(-2.86)
MB	0.0004	0.001	0.002	0.0003*
	(0.59)	(0.69)	(1.48)	(1.84)
Debt	-0.066***	0.001	-0.100***	-0.199***
	(-2.86)	(0.02)	(-4.00)	(-3.27)
Div_dummy	-0.011**	-0.112***	0.002	-0.026**
	(-2.39)	(-6.85)	(0.22)	(-2.19)
Year	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes
Ajust. R^2	0.149	0.226	0.218	0.147
N	3224	3377	3224	3377

5. Conclusion

The pecking order theory suggests that internal funds are the most favored source of financing because they minimize the firm exposure to the imperfections of capital markets, notably the informational asymmetries between managers and investors (Myers and Majluf 1984). In this framework, numerous empirical studies document that greater information asymmetry is suggestive of higher cash holdings to buffer against uncertainties and liquidity shocks (e.g., Opler et al., 1999; Dittmar et al. 2003; Ferreira and Vilela, 2004). Our work extends this area of research by analyzing the hypothesis that accruals quality influences corporate cash holdings based on the notion that, in general, reporting quality can gauge the extent of information asymmetry. Central to this debate is the fact that poor reporting quality is a source of increased corporate opacity and thus of greater information asymmetry between managers and investors whereas high reporting quality contributes in the reduction of information asymmetries.

Considering a sample of 6,501 firm-year observations of 741 unique firms over the period 2000-2015, we find a positive relationship between discretionary accruals and corporate cash holdings. To the extent that discretionary accruals is inversely related to accruals quality, this finding indicates that firms having poor accruals quality are inclined to have greater cash holdings. This result is consistent with the prediction that firms tend to increase their cash reserves when uninformed investors face information asymmetry driven, in particular, by low quality of accounting quality.

We also investigate the role that financial constraints may play in the effect of accruals quality on cash holdings. Greater information asymmetry is likely to be associated with higher costs of external finance and thus with more severe financial constraints. Accordingly, it is expected that cash holdings in firms with low reporting quality to be higher in firms that are financially constrained than in firms that are financially unconstrained. Supporting this conjecture, results show that firms with low reporting quality have higher cash holdings when they are more financially constrained, i.e., are smaller, do not distribute dividends and have high KZ and WW values.

Overall, our study provides additional evidence regarding the relevance of the information asymmetry for corporate cash holdings. Specifically, accounting reporting of low quality constitute a source for information asymmetries, leading firms to hoard cash for precautionary motive. Our conclusions are consistent with the notion that corporate transparency may be a key factor in explaining a firm's cash management policy, and in general, corporate policies.

References

Almeida, H., & Campello, M. (2010). Financing frictions and the substitution between internal and external funds. Journal of financial and Quantitative analysis, 45,589-622

Amihud, Y., & Mendelson, H. (1986). Asset pricing and the bid-ask spread. Journal of financial Economics, 17(2), 223-249.

Ball, R., & Shivakumar, L. (2008). Earnings quality at initial public offerings. Journal of Accounting and Economics, 45(2), 324-349.

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do US firms hold so much more cash than they used to?. The journal of finance, 64(5), 1985-2021.

Baumol, W. J. (1952). The transactions demand for cash: An inventory theoretic approach. The Quarterly Journal of Economics, 545-556.

Bhattacharya, U., Daouk, H., & Welker, M. (2003). The world price of earnings opacity. The Accounting Review, 78(3), 641-678.

Biddle, G. C., Hilary, G., & Verdi, R. S. (2009). How does financial reporting quality relate to investment efficiency?. Journal of accounting and economics, 48(2), 112-131.

Brennan, M. J., & Subrahmanyam, A. (1996). Market microstructure and asset pricing: On the compensation for illiquidity in stock returns. Journal of financial economics, 41(3), 441-464.

Denis, D. J., & Sibilkov, V. (2010). Financial constraints, investment, and the value of cash holdings. The Review of Financial Studies, 23(1), 247-269.

Dittmar, A., Mahrt-Smith, J., & Servaes, H. (2003). International corporate governance and corporate cash holdings. Journal of Financial and Quantitative analysis, 38(01), 111-133.

Duchin, R., Ozbas, O., & Sensoy, B. A. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. Journal of Financial Economics, 97(3), 418-435.

Easley, D., & O'hara, M. (2004). Information and the cost of capital. The journal of finance, 59(4), 1553-1583.

Easley, D., Hvidkjaer, S., & O'hara, M. (2002). Is information risk a determinant of asset returns?. The journal of finance, 57(5), 2185-2221.

Fama, E. F., & MacBeth, J. D. (1973). Risk, return, and equilibrium: Empirical tests. Journal of political economy, 81(3), 607-636.

Faulkender, M., & Wang, R. (2006). Corporate financial policy and the value of cash. The Journal of Finance, 61(4), 1957-1990.

Fazzari, S. M., Hubbard, R. G., Petersen, B. C., Blinder, A. S., & Poterba, J. M. (1988). Financing constraints and corporate investment. Brookings papers on economic activity, 1988(1), 141-206.

Fazzari, S. M., Hubbard, R. G., Petersen, B. C., Blinder, A. S., & Poterba, J. M. (1988). Financing constraints and corporate investment. Brookings papers on economic activity, 1988(1), 141-206.

Ferreira, M. A., & Vilela, A. S. (2004). Why do firms hold cash? Evidence from EMU countries. European Financial Management, 10(2), 295-319.

Foley, C. F., Hartzell, J. C., Titman, S., & Twite, G. (2007). Why do firms hold so much cash? A tax-based explanation. Journal of Financial Economics, 86(3), 579-607.

Francis, J., LaFond, R., Olsson, P., & Schipper, K. (2005). The market pricing of accruals quality. Journal of accounting and economics, 39(2), 295-327.

Gao, X., and Jia, Y. (2016). Internal control over financial reporting and the safeguarding of corporate resources: Evidence from the value of cash holdings. Contemporary Accounting Research, 33(2), 783-814.

García-Teruel, P. J., Martínez-Solano, P., & Sánchez-Ballesta, J. P. (2009). Accruals quality and corporate cash holdings. Accounting & Finance, 49(1), 95-115.

Ginglinger, E., & Saddour, K. (2007). Cash holdings, corporate governance and financial constraints. Working paper.

Gomariz, M. F. C., & Ballesta, J. P. S. (2014). Financial reporting quality, debt maturity and investment efficiency. Journal of Banking & Finance, 40, 494-506.

Harford, J., Mansi, S., Maxwell, W. (2008). Corporate governance and firm cash holdings in the US. Journal of Financial Economics 87, 535-555.

Hribar, P., & Collins, D. W. (2002). Errors in estimating accruals: Implications for empirical research. Journal of Accounting research, 40(1), 105-134.

Kaplan, S., and L. Zingales (1997). Do financing constraints explain why investment is correlated with cash flow? Quaterly Journal of Economics, 112, 169-216.

Keynes, J. M. (1936). The general theory of employment, money and interest. The Collected Writings, 7.

Kim, C. S., Mauer, D. C., & Sherman, A. E. (1998). The determinants of corporate liquidity: Theory and evidence. Journal of financial and quantitative analysis, 33(03), 335-359.

Koo, D. S., Ramalingegowda, S., & Yu, Y. (2017). The effect of financial reporting quality on corporate dividend policy. Review of Accounting Studies, 22(2), 753-790.

Korajczyk, R. A., & Levy, A. (2003). Capital structure choice: macroeconomic conditions and financial constraints. Journal of financial economics, 68(1), 75-109.

Kothari, S. P., Leone, A. J., & Wasley, C. E. (2005). Performance matched discretionary accrual measures. Journal of accounting and economics, 39(1), 163-197.

Kurt, A. C. (2017). How do financial constraints relate to financial reporting quality? Evidence from seasoned equity offerings. European Accounting Review, 1-31.

Lamont, O., C. Polk, and J. Saa´-Requejo, 2001, ‘‘Financial Constraints and Stock Returns,’’ Review of Financial Studies, 14, 529–544.

Lang, M., Raedy, J. S., & Yetman, M. H. (2003). How representative are firms that are cross-listed in the United States? An analysis of accounting quality. Journal of Accounting Research, 41(2), 363-386.

Leuz, C., & Verrecchia, R. E. (2000). The economic consequences of increased disclosure (digest summary). Journal of accounting research, 38(3), 91-124.

Leuz, C., Nanda, D., & Wysocki, P. D. (2003). Earnings management and investor protection: an international comparison. Journal of financial economics, 69(3), 505-527.

Linck, J. S., Netter, J., & Shu, T. (2013). Can managers use discretionary accruals to ease financial constraints? Evidence from discretionary accruals prior to investment. The Accounting Review, 88(6), 2117-2143.

Mikkelson, W. H., & Partch, M. M. (2003). Do persistent large cash reserves hinder performance?. Journal of Financial and Quantitative Analysis, 38(02), 275-294.

Miller, M. H., & Orr, D. (1966). A Model of the Demand for Money by Firms. The Quarterly journal of economics, 80(3), 413-435.kim

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. Journal of financial economics, 13(2), 187-221.

Myers, S. C., & Rajan, R. G. (1998). The paradox of liquidity. The Quarterly Journal of Economics, 113(3), 733-771.

Nanda, V., & Narayanan, M. P. (1999). Disentangling value: financing needs, firm scope, and divestitures. Journal of Financial Intermediation, 8(3), 174-204.

Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. Journal of financial economics, 52(1), 3-46.

Ozkan, A., & Ozkan, N. (2004). Corporate cash holdings: An empirical investigation of UK companies. Journal of Banking & Finance, 28(9), 2103-2134.

Porta, R. L., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. W. (1998). Law and finance. Journal of political economy, 106(6), 1113-1155.

Shin, M., Kim, S., Shin, J., & Lee, J. (2017). Earnings Quality Effect on Corporate Excess Cash Holdings and Their Marginal Value. Emerging Markets Finance and Trade.

Simutin, M. (2010). Excess cash and stock returns. Financial Management, 39(3), 1197-1222.

Sloan, R. (1996). Do stock prices fully reflect information in accruals and cash flows about future earnings? The Accounting Review, 71, 289-315.

Sun, Q., Yung, K., & Rahman, H. (2012). Earnings quality and corporate cash holdings. Accounting & Finance, 52(2), 543-571.

Whited, T.M., &Wu, G. (2006). Financial constraints risk. Review of Financial Studies, vol. 19, n°2, 531-559.