Cash Holdings: Determining Factors and Impact on Future Operating Performance for Listed vs. Unlisted Firms

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Abstract

Research suggests that the cash ratios of private firms are lower than the ones of public firms, which is not consistent with an expectation for increased importance of the precautionary motive for firms with fewer funding options The study provides a significant explanation on these lower ratios, attributed to differences in leverage, capital expenditures, internally generated cash flows, and corporate governance. There is further shown that firm listing status significantly affects cash holdings, even after controlling for the impact of financial constraints on cash policy. The study finally testifies that excess cash holdings are positively associated with future operating performance for private, but not public firms.

1. Introduction

Previous research has extensively examined the motivation and implications of corporate cash holdings. Determining factors behind firm cash policies include firm specific characteristics (Kim *et al.*, 1996; Bates *et al.*, 2009), capital constraints (Almeida *et al.*, 2004) or corporate governance and agency cost considerations (Pinkowitz *et al.*, 2006; Dittmar and Mahrt-Smith, 2007). Regarding the ease with which a firm can raise capital, and its relation to corporate cash policy, previous research has also testified that cash should be more valuable for firms facing relative difficulties in securing external funding, compared to firms which do not face such a constraint. In specific, Myers and Majluf (1984) argue that firms with higher cost of external financing should generate funds internally and use them to finance investments, and research has indeed confirmed that firms with easier access to capital markets have lower cash ratios (Opler *et al.*, 1999). Furthermore, firms with higher external financing costs tend to have more liquid assets (Kim at al., 1998) and precautionary cash balances are higher when the cost of external financing is high (Riddick and Whited, 2009 for the US; Pal and Ferrando, 2010 for firms from the euro area).

A firm characteristic which naturally affects the easiness with which equity capital can be secured is firm listing status. Brav (2009) observes that private or unlisted firms rely almost exclusively on debt, as opposed to equity financing, and face a relatively higher cost of capital than public or listed firms, a result of higher information obscurity for these firms. Saunders and Steffen (2011) further testify that private firms face higher financing costs, which are attributed to higher costs of information production, lower bargaining power, and governance characteristics. At this point, though, research has demonstrated a finding which is rather contradictive to the previous discussion: private or unlisted firms have in fact markedly *lower* cash holdings in comparison to their public or listed counterparts, both in the UK (Brav, 2009) and the US (Gao *et al.*, 2011). This last finding can be considered rather unexpected, as

literature on cash policy leads to the intuitive expectation that a group of firms with a more limited access to an important source of funding, that is equity markets, which also probably has to face a comparatively higher cost of financing, for purely precautionary reasons should exhibit higher, rather than lower cash ratios, compared to a group with relatively easier access to capital

The purpose of this paper is first to investigate the apparent puzzle of the low cash holdings of private firms by comparing their cash policies with a sample of public firms. The expectation is that differences in the cash ratios of public vs. private firms should be explained by factors with an observed ability to affect cash ratios, which in turn differ between the two groups, in specific leverage, as well as corporate governance and relative agency frictions.

Furthermore, previous literature has testified that financial constraints, such as firm size, dividend policy, or credit rating, significantly affect the cash policy of a firm (Almeida *et al.*, 2004; Sufi, 2009; Denis and Siblikov, 2010). Interestingly, there appears to exist no scholarly consensus as to what financial constraints actually represent. Sufi (2009, p.1069) underlines that the finance literature does not precisely define what *'financial constraints'* are, but rather broadly refers to them as restrictions in the ability to raise external funds. This is the definition given by Almeida *et al.* (2004) but it does not contain an exact or binding description of what the abovementioned limitation consists of. At this point, evidence by Pal and Ferrando (2010), using a non-US sample, indicates that cash flow sensitivity of cash, a measure used by Almeida *et al.* (2004) as a proxy for financial constraints, in an inadequate measure for assessing whether a firm is financially constrained or not. Therefore, the second scope of this study is to examine whether the listing status of a firm works as a stand-alone constraint with respect to influencing its cash policy. To the extent that firm listing status naturally affects the opportunities and costs of raising capital, the scope of this study is to

assess whether this status constitutes a stand-alone or stronger influence on cash ratios than financial constraints employed by previous research.

The study findings suggest that the differences in the cash ratios of public vs. private firms are the result of differences and different sensitivities to leverage, dividend payments, capital expenditures and cash flows between the two groups. First, regarding corporate debt and its association with cash, leverage and cash holdings are observed to be negatively interrelated, in accordance with previous literature (Opler *et al.*, 1999; Bates *et al.*, 2009). Private firms are then observed to be more levered, consistent again with previous research (Brav, 2009, for the UK, Asker *et al.*, 2010, for the US): therefore higher debt levels for private firms are subsequently reflected into lower cash ratios as well. Second, capital expenditure is found to negatively affect cash ratios, and there is shown that this association is more pronounced for private vs. public firms, with a subsequent negative influence on the cash ratios of private firms. Finally, public, but not private firms, are observed to accumulate cash at the expense of returning capital to shareholders in the form of dividends.

The study also testifies a significant difference in the way internal cash flow generation affects the cash ratios of the two groups. In specific, there is found that the cash ratios of private firms are positively related to internally generated cash flows, and the exact opposite occurs for public ones. This finding, in the case of private firms, is in contrast to previous evidence on the behavior of cash flow, as a determinant of corporate cash levels. This is because cash flow has been expected and found to negatively relate to cash (Kim *et al.*, 1998). This last result is interpreted as an indication of increased precautionary concerns from the side of private firms, which cannot possibly afford to keep low levels of cash even when internal cash flow generation is strong.

Furthermore, it is testified that the listing status of a firm *per se* is a significant contributor to corporate cash holdings, with a positive influence on the cash ratios of public vs. private firms. The listing status of a firm is found to be a strongly significant determinant of cash ratios, and its influence on cash ratios is found to persist even after controlling for financial constraints like the ones used by previous research. This finding is interpreted as evidence that any kind of barrier, which imposes limited access to funding, may work as a financial constraint, in line with the arguments by Sufi (2009). In other words, a financial constraint can be any factor adversely affecting the easiness with which capital can be raised, not necessarily related to e.g. firm performance or credit rating.

In addition, there is provided evidence that differential governance characteristics affect the cash holdings of private and public firms in a dissimilar way. For public firms, the existence of a more dispersed shareholder base is found to positively affect cash holdings. Interestingly, for private firms, there is found the exact opposite: the existence of a few shareholders or of a controlling shareholder is observed to *positively* affect cash. The evidence on public firms is consistent with a previous stream of literature, according to which lower shareholder protection allows managers to accumulate cash (Dittmar *et al.*, 2003; Kalcheva and Lins, 2007), when good shareholder protection could be more difficult to achieve with a more dispersed shareholder base (Opler *et al.*, 1999). Private firms, however, should not be subject to the same management-ownership separation frictions as public firms are (Easterbrook and Fischel, 1986): as management may overlap with ownership, managers may have increased precautionary preoccupations and want to accumulate cash for purely precautionary concerns. This could exist because what is good for the manager *'is also good for the firm'*, if managers work harder and *'engage in less self-dealing'* (Easterbrook and Fischel, 1986). At the same time, increased CEO ownership can be accompanied by declines

in agency costs (Hope et al, 2011), as the management becomes more and more engaged in the interests of the firm.

However, Nagar *et al.* (2011) argue and confirm empirically that for private firms, the existence of a controlling shareholder is *not* a favourable factor for corporate governance, as this controlling party can benefit at the expense of the rest of the owners by engaging in unilateral actions. This problem could be especially pronounced for private firms, as for them, the absence of market trading does not further permit to rely on the stock market as a monitoring device (Easterbrook and Fischel, 1986). The absence of an established market for stock trading also deprives uninformed investors of the opportunity to be able to purchase and readily dispose off their shares, so minority shareholders might affront increased risk of exploitation in private firms (Easterbrook and Fischel, 1986). Taking the previous observations as a whole, findings that the presence of a few owners or of a controlling shareholder actually results in higher cash ratios for private firms is interpreted as either an indication of increased importance of precautionary motives for these firms, or a possible sign of weak corporate governance.

Overall, it is found that the cash ratios of private firms relate positively to internally generated cash flows (and the opposite to be the case for public firms), and that private firms have a tendency to accumulate cash in the presence of a controlling shareholder, which is actually the most frequent case for these firms: still their cash ratios are lower rather than *higher*, compared to the ones of public firms, despite these observed positive influences. The study therefore tentatively attributes the significantly lower cash ratios of private firms to the strength of the factors discussed (leverage, capital expenditures). An alternative explanation could be the possible inability of private firms to generate enough cash by themselves in the first place, in line with the Denis and Siblikov (2010) findings that the exceptionally low cash ratios of constrained firms could be partly the result of low cash flows generated internally.

This explanation receives further support by the fact that evidence by this study also points towards relatively lower profitability ratios for the private firm sample, when accrual profit naturally represents the element which is translated into cash flows. This interpretation is also consistent with Gao *et al.* (2011) that US public firms generally manage to add more to their cash reserves in a given year, compared to private firms.

Previous research has also indicated that cash is more valuable for financially constrained, vs. unconstrained firms (Almeida *et al.*, 2004; Faulkender and Wang, 2006). In addition, regarding the impact of cash on future performance, Mikkelson and Partch (2003) show that large cash holdings do not necessarily harm firm performance, when Harford *et al.* (2008) observe a negative association between unexplained levels of cash and performance. Unexplained levels of cash -or cash beyond the level necessary to support everyday operations or obligations- is considered to be indicative of differential signals for future performance for public vs. private firms. This is because as the two groups face different degrees of easiness in accessing capital markets, their precautionary motives could be also of different strength. So, stockpiling cash in one year could be an indication that a private firm has investment opportunities in mind, and this amount cannot be secured externally as readily as for a public firm. The study testifies that excess or unexplained levels of cash are not significant determinants of future performance for public firms, overall consistent with the findings by Mikkelson and Partch (2003) for large cash holders, but they positively affect the future profitability of private firms. This result is interpreted as an additional manifestation of capital raising constraints for private firms, compared to public ones. As the former group should not have equal opportunities in securing funding externally, holding excess levels of cash in one year could be an indication that the firm is in an expansion phase, and thus excess cash relates positively to future profitability for private firms.

To examine the above questions, the study makes use of the UK setting. This is because, first of all, in this country, both public and private firms are required to disclose their financial statements with the UK national corporate registry (Brav, 2009; Saunders and Steffen, 2011). This way, there exists data available for a natural public and private firm sample. The UK context further presents advantages in terms of regulatory, accounting and tax regime. In specific, in the UK, public and private firms face an equivalent regulation environment, equal requirements to report audited financial statements, *and* tax rules (with the exception of very small firms not included in this study) (Ball and Shivakumar, 2005). This uniform regulatory and tax environment secures that the main difference between the two groups, public and private firms, should be the existence of different options and opportunities with respect to raising capital as a result of a firm's listing status, which is exactly the topic of interest of this study.

The rest of the paper is organized as follows: Section 2 provides a brief review of related literature and discusses the study motivation, and Section 3 describes the sample selection process. Section 4 provides descriptive statistics of key operating ratios for public and private firms, and examines the relation between financial constraints and firm status. Section 5 investigates the determinants of cash ratios for private and public firms, and further examines the impact of cash on future operating performance. Finally, Section 6 concludes the study by summarizing the key findings, and discusses their implications.

2. Previous Literature and Motivation

2.1. Determinants of Cash Ratios for Private and Public Firms

Purely precautionary motives (Han and Qiu, 2007) and transaction cost theory (Opler *et al.*, 1999) should make the group of firms with a more difficult access to capital, that is private firms, more prone to hold higher levels of cash. In addition, Gao *et al.* (2011) testify that private firms have higher cash flow sensitivity (propensity to save cash out of internally

generated cash flows) than public firms, which is consistent with the cash flow sensitivity behavior of more financially constrained firms (Almeida *et al.*, 2004). However, private firms have been found empirically to be holding lower cash than public ones (Brav, 2009; Gao *et al.*, 2011), so the purpose of this study is first to examine why a group of firms with a naturally more difficult access to capital and higher costs of funding (Saunders and Steffen, 2011) hold lower cash than a group with greater variation of capital structure choices in place.

At this point, there exists a number of factors and corporate characteristics, which differ between public and private firms, and which in turn could directionally affect the relative cash ratios of the two groups. The purpose of this section is to assess a number of such factors, and their possible influence on the cash ratios of private vs. public firms. Brav (2009) has shown that private firms in the UK have leverage ratios that are, on average, 50% higher than the ones of public or listed firms, and have limited access sources of capital other than debt. Early evidence by Asker *et al.* (2010) suggests a similar pattern for the leverage of private firms in the US. On the association between firm leverage and corporate cash policy, Baskin (1987), John (1993) and Kim *et al.* (1998) argue that firm debt is expected to relate to cash ratios negatively for two reasons. First, as debt increases, the cost of funds needed to invest in liquidity increases as well, leading to reductions in overall liquidity; second, firms with high access to debt can use debt as a substitute instead of holding liquid assets. Opler *et al.* (1999), Bates *et al.* (2009), and Ozkan and Ozkan (2004), for the UK in specific, provide robust evidence on a negative relation between cash holdings and leverage. To the extent that private firms hold significantly more debt than public firms, and leverage relates negatively to cash ratios, other things equal, the cash ratios of private firms, compared to the ones of public firms, should be receive negative influence from leverage.

With respect to other factors which could affect the cash ratios of public vs. private firms, according to Mikkelson and Partch (2003), Froot (1993) and Froot *et al.* (1993), firm value is

protected by large cash holdings, as the latter insulate the firm from the variability of cash flows. In addition, large cash reserves can deter competition in product markets (Mickelson and Partch, 2003; Froot, 1993), when according to Campbell *et al.* (2001), idiosyncratic volatility has overall increased in recent periods, making cash possibly even more valuable to affront this higher volatility. Cash holdings have also been shown to increase a firm's bargaining power with labor unions (Klasa *et al.* 2009). As public firms are more exposed to the market place and face increased market monitoring, to the extent that competition is greater for these firms due to greater visibility, it would be expected that they should hold larger cash ratios than private firms for this reason. The last two arguments on leverage and market competition are expected to work in the opposite direction, compared to the precautionary motive for cash holdings, as they predict that the cash ratios of private firms should, in fact. be lower than the ones of public firms.

2.2. Agency Considerations and the Cash Policies of Private and Public Firms

Regarding differences in corporate governance, agency frictions, and how these could affect the relative cash ratios of public and private firms, private firms have greater managerial ownership and are generally more closely held than public firms, with shareholders to be taking a more active role in their management (Chen *et al.*,2010). Jensen and Meckling (1976) define as a zero agency cost situation the one when firm is owned and managed by the same person and Fama and Jensen (1983) argue that in private firms, agency costs are minimized, as there exists only a few managers, which are simultaneously the largest residual claimants.

On the governance of private firms, Nagar *et al.* (2011) identify two problems: the problem between managers and owners (vertical problem) and the one between majority and minority shareholders (horizontal problem). For private firms, if management overlaps with ownership,

there are not expected to exist equivalent ownership-management incentive misalignment issues, as for public firms. The fact that management may overlap with ownership in private firms can be seen as a positive attribute, as what is good for the manager will also benefit the firm (Easterbrook and Fischel, 1986). Increased CEO ownership can be accompanied by lower agency costs (Hope *et al.*, 2011), as the management becomes may be more engaged in the best interests of the firm. In this later case, under the expectation of no expropriation by the management, it is expected that the existence of one or few shareholders or a controlling shareholder for a private firm could result in increased importance of precautionary motives, leading to cash accumulation, in an effort to secure the firm and its going concern. As the existence of a controlling interest is more frequent in private firms, and a controlling party may have high precautionary concerns, precautionary considerations could positively affect the cash ratios of private, as opposed to public firms.

However, Nagar *et al.* (2011) argue that the main problem in unlisted firms is actually the horizontal one, and consider the absence of ownership concentration in close corporations to be a sign of good corporate governance. In specific, they argue and confirm that for private firms, the existence of a controlling shareholder is not a favourable factor for corporate governance and does not favour operating performance, as this controlling party can take unilateral actions, at the expense of the rest of firm owners. This context could be more pronounced for private firms, as in their case, there does not exist an active stock market to be providing relevant monotoring (Easterbrook and Fischel, 1986). The lack of market trading also deprives uninformed investors of the opportunity to purchase and readily dispose off their share in a firm, so minority shareholders might be subject to higher risk of exploitation in the case of private firms (Easterbrook and Fischel, 1986).

In this case, the existence of a controlling shareholder for private firms would be a sign of suboptimal governance. By hypothesizing that poor governance associates with larger cash

holdings (Dittmar *et al.*, 2003; Kalcheva and Lins, 2007), a controlling party in private firms could positively affect their cash ratios, but in this case because of self-serving, and not precautionary reasons.

All previous discussion on agency frictions, and how these may affect cash holdings for private and public firms, leads to the theoretical expectation that, other things equal, the cash ratios of private firms should higher than the ones of public counterparts because of agency considerations, for either precautionary or suboptimal governance reasons. However, there exists another agency factor that could *negatively* affect the cash ratios of private vs. public firms. In specific, higher management risk incentives may result in lower cash ratios, as cash holdings are less risky projects (Tong, 2010). In private firms, often managers have a large percentage of their wealth tied in the corporation, by putting up capital and bearing relevant risk (Easterbrook and Fischel, 1986). In addition, there might exist enhanced risk taking incentives if managerial and shareholder interests become increasingly aligned (Saunders and Steffen, 2011). To the extent that increased risk bearing by the management results in lower cash ratios, if the management of private firms bears more risk than the one of public firms, it is expected that the cash ratios of private firms should receive a negative or decreasing influence due to this agency factor. At the same time, leverage can be viewed as an internal control mechanism, with an ability to reduce over-investment problems (Moon and Tandon, 2007). In such a case, the most levered group, that is private firms according to previous research, should be less prone to face over-investment issues, and accumulate cash in relation to such objectives.

2.3. Cash Holdings and Future Performance of Private and Public Firms

Before proceeding with any discussion on cash and subsequent operating firm performance, it should be noted that when examining the operating consequences of cash, there is made

reference to excess or unexplained levels of cash, and not cash levels in general. This is because a certain amount of cash holdings is actually necessary to support day-to-day operations and secure the timely repayment of a firm's obligations. Regarding the implications of such cash holdings for the subsequent performance of public and private firms, there are identified two separate factors with an ability to differentially associate cash with performance for the two groups. First, as the two groups do not have equivalent sources and costs of financing, their precautionary motives should differ as well. Thus, unexplained levels of cash are not expected to have the same implications for future performance for both groups; in the case of private firms, excess or unexplained levels of cash could just be an indication of the existence of future growth opportunities, when such motivation should not be as imminent for public firms.

Second, as discussed already, private and public firms differ in terms of corporate governance structures, when cash stockpiling has been associated with weak corporate governance (Pinkowitz *et al.*, 2006; Dittmar and Mahrt-Smith, 2007). To the extent that weak corporate governance relates negatively to future operating performance (Ang *et al.* 2000; Nagar *et al.*, 2011), if one considers unexplained levels of cash to be a signal of poor governance, it is expected that excess cash levels will be less harmful for future performance for the group which affronts fewer governance problems. The issue that remains open here is which group actually faces fewer agency issues. With respect to the vertical governance problem mentioned before, management and ownership incentive alignment issues should be less frequent in private firms. However, the horizontal (or minority shareholder protection) problem could be equally present in private and public firms. As private firms appear to be in a relatively better position with respect to the vertical problem, it is expected that governance should receive fewer negative influences for this group as a result of the listing status. So, excess cash holdings are expected to have fewer negative influences on the subsequent

operating performance of private, in comparison to public firms, due to governance frictions. Taking the above considerations as a whole, the expectation is in favour of excess cash holdings giving relatively more positive indications for the future operating performance of private, compared to public firms, for reasons relating to both capital market opportunities, as well as relative agency frictions.

3. Sample Selection

The sample of public and private firms was downloaded from the Amadeus Database, which contains data on private or unlisted firms, compiled by Bureau Van Dijk. As Amadeus reports data for a rolling ten year window, the sample covers the period 2001-2009. All public and private firm financial statements in the UK must be audited if annual sales exceed £1 million after June 2000. Data was downloaded for all UK listed public firms on the database (1,826 firms) and all unlisted UK firms with a known value for the Amadeus cash flow item (Profit for the period + Depreciation) in their last reported statements, and a turnover exceeding £1 million in their last statements (66,510 firms). In total, Amadeus provided data for 2,909,236 UK private firms[1]. Following Brav (2009) firms are included in the sample no matter if they are subsidiaries of other firms, or their accounts are consolidated or not, and there are further excluded financials, utility firms and public sector firms (SIC codes in the 6000s, 4900-4941, and 9000s, respectively) as well as firms with no data on sector SIC codes, and firms for which the reported legal form was Public Investment Trust, Assurance Company, Guarantee, Limited Liability Partnership, Not Companies Act, Other, Unlimited, and Not Classified. There are further excluded firms with no data on Cash and Equivalents,

[1] For a detailed description of the legal framework for public and private firms, see Brav (2009) and also Ball and Shivakumar (2005) and Saunders and Steffen (2011). Amadeus has been employed by previous studies on private firms, such as Saunders and Steffen (2011) For a detailed description of Amadeus see Saunders and Steffen (2011) and Burgstahler *et al.* (2006). Bureau Van Dijk is also the creator of Fame Database.

Financial Expenses, Profit before Tax and Earnings before Interest and Tax (EBIT) for every year during 2001-2009 and this resulted in 1,343 public and 48,712 private firms.

Given the large amount of data for private firms, to ensure the results are not affected from extreme observations, all variables for private firms were truncated at 0.1% at both sides of the distribution, and medians are used throughout the study to mitigate possible outlier issues affecting results. Furthermore, before performing any regression analysis, all variables included were additionally truncated at 0.5% at both sides of the distribution, for public and private firms separately. For a firm-observation to be included for a given year in any calculation, there are imposed further criteria on data availability for Sales, Total Assets, Shareholders' Equity, Profit/Loss before tax, Earnings before Interest, Tax, Depreciation and Amortization (EBITDA; Net Income, Financial Expenses, Cash (= Cash and Equivalents), and either Long term or Current debt. Finally, given that Amadeus does not provide information on dividends, Capital Expenditures (CapEx – CPX) and Cash Flow from Operations (CFO - from the Cash Flow Statement); given that these items were necessary for the course of the study, information on these specific items was complemented from Fame Database.

Regarding industry sector breakdown for industry controls, there is followed a modified Cohen and Zarowin (2010) grouping of 2-digit industry codes into a total of 17 sectors. In addition, 2-digit sector codes not included in the Cohen and Zarowin grouping were assigned into one of the 16 sectors compiled by them; and there has been also added one more sector to include services firms. The exact sector grouping according to 2-digit SIC codes is reported in the Appendix.

4. Descriptive Statistics

4.1. Descriptive Statistics for Public and Private Firms

Table 1 (Panels A and B) reports median ratios for key operating characteristics, for public and private firms, respectively, both on a yearly basis, and for the period 2001-2009 as a whole. Data reported includes Earnings before interest tax, depreciation and amortization (EBITDA)/Sales, EBITDA/Total Assets (TA), Cash/TA, LTD/TA, CD/TA, TD/TA (long term, current, and total debt/TA)[2], Capital Expenditures (Capex or CPX)/TA, and percentage of firm observations paying dividends. Table 1 also reports the mean and median number of shareholders and percentage of firms for which there exists a controlling shareholder[3], and finally number of observations according to year, and results of the Wilcoxon/Mann-Whitney test for median ratio values between public and private firms for the period 2001-2009.

Insert Table 1 here.

The summary statistics on debt, cash and profitability ratios confirm previous findings by Brav (2009) for the UK, by showing median debt ratios of 18.4% for public firms and 28.7% for private firms, with the driver of the higher debt ratios for private firms to be predominantly, current debt. Median cash ratios during 2001-2009 for private firms are lower than the ones of public ones (4.7% vs. 7.2%) and the profit margins of public firms (8.2%) outperform the equivalent margins (5.2%) of their private counterparts. Public firms additionally exhibit improved profitability compared to private firms, regardless of whether EBITDA is divided by total assets instead of sales (9.10% vs. 8.53% for the sample period using scaling by TA rather than sales). Public firms have marginally higher Capital Expenditures, with a median CPX/TA of almost 2.9% during the sample period, in comparison to private firms (1.9%). In contrast to US evidence, the cash ratios of UK public firms appear to be lower than those reported by Bates at al. (2009); at the same time, though,

[2] Total assets are not defined by subtracting cash, following recent studies by Bates *et al.* (2009) and Denis and Siblikov (2010).

[3] Data on the number of shareholders and the existence of a controlling shareholder was extracted from the Amadeus Ownership Database (Bureau Van Dijk). Bureau Van Dijk's Amadeus Ownership Database defines a controlling shareholder as a party or company which directly or indirectly owns more than 50% of the company in question.

Bates *et al.* (2009) also report lower leverage ratios for the US, in the range of 17.3% to 14.6% during 2001-2006. Differences in cash, debt, and profitability ratios during the sample period between public and private firms are significant at 1% level, with the exception of the ratio for long term debt.

There are also marked differences between public and private firms in their dividend distribution patterns. In the case of public firms, a median 56.4% of firm observations paid dividends, while the relevant percentage for private firms is just 31.9%. Interestingly, the proportion of dividend paying private firms is also remarkably stable over time, while the opposite occurs for public firms, for which there is a steady decline in the median proportion dividend paying firms, starting with 63.36% in 2001 to end at 46.7% in 2009. This tendency among public firms is consistent with US evidence on disappearing dividends (Bates *et al.*, 2009; Fama and French, 2001). Finally, it is also interesting to note that private firms have on average just two shareholders, while the figure for private ones is 36 (median 25); furthermore, while only 7.7% of public firms have a controlling shareholder, the overwhelming majority (71.1%) of private firms are controlled by a single shareholding party. Overall, the summary statistics indicate clear differences in leverage, dividend payment patterns and ownership structures between public and private firms, as well as some differences in profitability and interest coverage ratios.

4.2. Descriptive Statistics for Constrained and Unconstrained Firms

Table 2 presents summary statistics using 2001-2009 median values for a number of fundamental variables for the public and private firms (Panel A) and for financially constrained public and private firms (Panel B) according to the following five (C1 to C5) financial constraint definitions. C1 includes firms which belong to the bottom three dividend

payout (payout defined as dividends/operating income)[4] annually rebalanced deciles, calculated for public and private firms separately. C2 includes firms with EBITDA/Financial Expenses < 1 for two consecutive years or <0.8 for any year. C3 includes firms with EBITDA/Financial Expenses <0.5 for any year. C4 includes firms with negative net income, and, finally, C5 includes firms which belong to the bottom three size (TA) annually rebalanced deciles, calculated for public and private firms separately.

The C1 and C5 definitions of constrained firms follow from Almeida et al (2004), Campello *et al.* (2010) and Denis and Siblikov (2010), C2 and C3 from the way Asquith *et al.* (1994) and Andrade and Kaplan (1998) define financially distressed firms, and C4 is based on the Bates *et al.* (2009) definition of constrained firms. Thus, C2 and C3 actually refer to the way previous studies have defined financially distressed, rather than financially constrained firms. However, Almeida *et al.* (2004) and Denis and Siblikov (2010) have used -in addition to size and dividend payout proxies for constraints- constraint definitions based on debt and paper ratings, information on which is not available for this sample, especially as the greatest part of it consists of private firms. Instead, following Asquith *et al.* (1994) and Andrade and Kaplan (1998), and additionally to account for the way Bates *et al.* (2009) define constrained firms, there are used readily available proxies for financial distress in order to use alternative proxies for constraints. The underlying assumption is that financial distress affects the easiness with which external capital can be accessed and secured.

Descriptive evidence from Table 2 on interest coverage ratios does not suggest that private firms are more distressed, as far as this ratio is concerned, than public ones, given that the value of this ratio for private firms is marginally higher (almost 6 vs. 5.3 during the sample period). When comparing between constrained public and private firms (Panel B) results generally vary depending on the constraint definition used each time. Constrained private

[4] For the calculation of C1 based on dividend payout ratios, Almeida *et al.* (2004) make use of total distributions, including both dividends and stock repurchases; however, information on the last item is not available for the study sample.

firms according to C1 and C5 have lower leverage than the whole sample of private firms in Panel A, with ratio values close to 20%, in comparison to an overall of nearly 30%; the same lower leverage pattern holds for constrained public firms only when firm (C5) size is used as a constraint proxy. On the basis of C2, C3 and C4, which all relate to aspects of financial distress, constrained private firms have leverage ratios higher than the whole sample of private firms; in contrast, the leverage for constrained public firms is comparable to the one observed for the whole sample of public firms. Constrained public firms according to C2 and C3, however, exhibit significantly lower profitability than the whole sample, Interestingly, low dividend paying public and private firms appear to be larger firms, in terms of median sales and TA.

Insert Table 2 here.

In terms of cash ratios, consistent with the notion that cash provides important benefits to financially constrained firms, the cash ratios of public firms for constraint definitions C2, C3 and C5 are higher than the public group's median. On the other hand the cash ratios across private firms, with the possible exception of C5, are remarkably similar. Thus, this evidence suggests that private firms, at least in terms of cash ratios, are more homogeneous than their public counterparts; in other words, on the basis of descriptive statistics only, the private firm status shows to be the key determinant of their cash holdings that overrides any of the other constraint definitions. However, the most puzzling aspect of these results, consistent, though, with Brav (2009) and Gao *et al.* (2011) remains the overall lower median cash ratio of private firms in comparison to their public counterparts, an issue that there will be explored further in Section 5. In short, it is found that constrained private firms tend to be more leveraged, both with long and short term loans, maintain stronger interest coverage and some of them, according to the constraint definitions not related to financial distress, that is C1 and C5, achieve very satisfying returns on equity.

5. Empirical Findings

5.1. The Determinants of Cash Ratios – Public vs. Private Firms

To examine the apparent differences in cash holdings by public and private firms, there is estimated the following panel data regression for public and private firms together during 2001-2009:

$$\frac{Cash}{TA} \quad or \quad Next\ year \frac{Cash}{TA}$$

$$= a_1 + a_2 \times PUB + a_3 \times TD + a_4 \times ROE + a_5 \times LnTA + a_6 \times CF$$

$$+ a_7 \times NWC + a_8 \times CPX + a_9 \times StDIndCF + a_{10} \times DIVD$$

(Equation 1)

Cash equals Cash/TA. PUB is a dummy variable equal to 1 if the firm is public and 0 if private. TD is Total Debt (Current+ long term debt)/TA, LNTA equals the natural logarithm of Total Assets, ROE is Net Income/Positive Shareholders' Equity, CF is Cash flow (Profit for the period+ Depreciation)/TA, and NWC is net working capital (Stocks + Debtors-Creditors)/TA. StDIndCF equals median industry cash flow volatility, calculated as the median standard deviation of Cash flow/TA (defined as previously) for the industry during 2001-2005 and 2006-2009, according to 17 industry sectors (as described in Section 2). Finally, DIVD is a dummy variable taking the value of 1 if the firm gives dividends and 0 otherwise [5].

As in Brav (2009) all regressors are multiplied by public and private firm dummy variables, Pub X and Priv X. Pub X (Priv X) is the variable X interacted with a dummy equal to one (zero) if the firm is public and zero (one) if private. This empirical framework permits us to investigate within the same setting into differences in the factors which explain the cash ratios

[5] Changes in cash is not employed as the dependent variable, as this model specification would be adequate for testing the direction and strength of cash-to-cash-flow sensitivity, which has been observed by Gao *et al.* (2011) to be relatively higher for private firms in the US, when the scope of this stidy is to examine the relative determinants of cash levels for private vs. public firms.

of public and private firms, by simultaneously taking into account listed or unlisted firm status. Regressions are run using heteroskedasticity robust standard errors and by adding year dummies, and industry sector dummies for 17 industry sectors (not reported). All variables included were additionally truncated at 0.5% at both sides of the distribution, for public and private firms separately.

Previous studies on the explanatory variables of cash ratios have either used both dependent and independent variables at time *t* (Bates *et al.*, 2009; Almeida *et al.*, 2004; Gao *et al.*, 2011; Opler *et al.*, 1999; Riddick and Whited, 2009; Denis and Siblikov, 2010) or have used a lag for regressors (Brav, 2009; Tong, 2010) to account for possible endogeneity. As the focus is on assessing the possible differential influence of several corporate characteristics on cash for public vs. private firms, it is considered that the contemporaneous setting is the one that fits best the purposes of the analysis, and also permits making use of a greater number of observations. Nonetheless, all results have been repeated by placing the dependent variable at *t+1*. The basic model specification follows the empirical models used in previous literature (e.g. Bates *et al.*, 2009; Harford *et al.*, 2008; Opler *et al.*, 1999; Kim *et al.*, 1998). Table 3 Panel A Panel A reports results when the dependent variable is Cash/TA and Panel B for Next year Cash/TA. There also reported the p-values of the test Priv X = Pub X next to every regression results, performed for the regression coefficients.

Insert Table 3 here.

Table 3 shows that firm size, net working capital (NWC), capital expenditures (CPX) and leverage and are all negatively related to cash levels for both public and private firms, confirming previous literature (e.g. Opler *et al.*, 1999; Bates *et al.*, 2009). The public status dummy PUB always has a positive and significant coefficient, indicating that firm status *per se* is a significant determinant of cash holdings. In line with the precautionary motive for cash holdings, for both public and private firms, industry cash flow volatility is found to relate

positively to cash holdings, and this result is more strongly significant for private firms. Dividend payment proves to be a significant and negative contributor for public, but not private firm cash ratios, and the opposite occurs for ROE (with a positive and significant association with cash for private firms only). The negatively significant relation between dividend payments and cash ratios for public firms only could reflect the choice of these firms to accumulate cash instead of paying out dividends. Overall, results are robust to replacing current year with next year cash ratios, to mitigate endogeneity concerns (Table 3 Panel B).

Furthermore, firm cash flow has been expected in theory to relate negatively to liquid assets, as firms with higher cash flow can afford to keep lower levels of cash, resulting in a negative relation between cash flow measures and holdings of liquid assets (Kim *et al.*, 1998). A very interesting finding is that the cash ratios of public firms are negatively related to firm cash flow, while the exact opposite occurs for private firms. This finding, for private firms, contradicts the previously testified behavior of cash flow for firm cash ratios (Kim *et al.*, 1998; Bates *et al.*, 2009). This cash flow behavior for private firms is considered to be indicative of the constraint that firm listing status may impose on firm cash policy: as listing status may affect the means of raising capital, private firms might not, actually, afford to keep lower levels of cash when cash flow generation is strong. In addition, the positive coefficients for ROE and cash flow for private firms only, could further indicate that whenever the opportunity arises in terms of profitability and internally generated cash flows, private, but not public firms take it as a chance to increase liquidity.

It is also worth noticing from results for the test Priv X = Pub X, performed for the regression coefficients, that coefficients for debt, firm size, cash flow, volatility of industry cash flows and dividend payment all differ significantly in the way they affect the cash ratios of the two groups. In the case of the change in cash regression, cash flow significantly differs and so does ROE, with the exception of the other variables. Overall, findings from Table 3

indicate that the significant reasons behind the differences in the cash holdings of public vs. private firms include debt, size, cash flow and also CPX.

However, all previous analysis highlights how differences in the cash ratios of private firms can be explained, without shedding light on to answer the question of why the cash ratios of private firms are actually lower. Regarding economic differences in the determinant factors of cash ratios of public and private firms, differing intensities in these factors, and how these differences could help understand why the cash ratios of private firms are actually *lower*, results are interpreted with a certain degree of caution, as coefficient values refer to multiplicative terms. When statistical significance is comparable for a factor between the two groups, the coefficients of the multiplicative terms Pub (Priv X) are generally higher in the case of public firms, with the exception of CPX. Private firm cash ratios appear to be more sensitive to capital expenditures, or, if a private firm spends into CPX, this strongly adversely affects its cash ratio. This is consistent with the expectation that private firms will have no easy way to positively affect cash when simultaneously spending heavily on CPX in a given year i.e. readily generate external capital to prevent cash ratios from diminishing, if not enough cash is generated internally within a year.

On lower cash for private firms, consistent with the Kim *et al.* (1998) argument on liquidity costs and the substitution potential between leverage and cash, the results on Table 3 suggest that the differences in the cash ratios of public vs. private firms should be also the result of differences and different sensitivities to leverage. Private firms have higher debt ratios (confirmed by data on Table 1) and thus differences in leverage between the two groups are reflected in the relevant cash ratios as well. Table 3 Panel B, for the test Pub X = Priv X confirms that the debt regressor significantly differs between the two groups. Despite the fact that the coefficient of the multiplicative term for public firms PubTD is higher, in absolute

terms, than PrivTD, the fact that leverage for private firms is significantly, and around 50%, higher, should aggravate the negative association between leverage and cash for private firms.

At the same time, though, if cash flow generation for private firms relates positively to cash ratios, as testified, this would contribute to private firms having *larger r*ather than *lower* cash ratios, compared to public firms, other things equal. However, it is observed that the cash ratios of public firms are actually *lower*. This latter fact is therefore tentatively attributed, at least in part, to possible inability of private firms to generate enough cash in the first place in a given year, or as much cash as public firms, in line with the Denis and Siblikov (2010) findings that the exceptionally low cash ratios of constrained firms could be partly the result of persistently low cash flows. The findings from Table 1, that private firms exhibit lower profitability ratios (EBITDA/Sales and EBITDA/TA) contribute to this interpretation. Gao *et al.* (2011) reach a similar conclusion for a sample of private firms from US, by observing public firms to hold more cash as they are able to add more to their cash reserves in a given year than private firms. Taking the findings of Table 3 as a whole, the lower cash ratios of private firms are generally attributed to relative differences in sensitivity of cash to capital expenditures, to the fact that leverage is higher for private firms, and possibly to inability of private firms to generate enough cash flows internally in order to keep their cash holdings in pace with the ones of public firms[6].

5.2. Corporate Governance and Cash Ratios – Public vs. Private Firms

Following previous literature, which has shown corporate governance characteristics to be a significant contributor for cash ratios (Pinkowitz *et al.*, 2006; Dittmar and Mahrt-Smith, 2007;

[6] Recent evidence suggests that public US firms hold more cash predominantly because they face greater information disclosure costs, measured in the form of industry concentration and information leakage (Farre-Mensa, 2011). This study is different from Farre-Mensa (2011) as the focus is on the differential impact of traditional determinants of cash holdings for public vs. private firms. There are not imposed the controls employed by this research for information disclosure costs (Farre-Mensa, 2011) so there cannot be discarded the possibility for the cash ratios of public firms to be receiving such a positive influence from the abovementioned factor. Still, the controls employed by running Equation 1 point towards a significant impact of a number of corporate factors with a known effect on cash, which influence cash policy differently for each group.

Harford *et al.*, 2008; Tong, 2010); there is further controlled the impact of differing corporate governance mechanisms on the cash ratios of listed vs. unlisted firms. To control for differences in ownership structure and controlling shareholders among private and public firms, there are include two additional variables in Equation 1; the natural logarithm of the number of shareholders (NOSH) and a dummy variable taking the value of 1 if there exists a controlling shareholder for a firm, and 0 otherwise (CSHD). The results for these additional variables (separately and together) are reported in Table 4.

Insert Table 4 here.

Table 4 shows that the number of shareholders is positively related to cash holdings for public firms, and negatively related for private firms, with both results to be statistically significant. The effect of this variable on cash also appears to significantly differ between the two groups, as indicated by the test Pub X = Priv X. The presence of a controlling shareholder is not observed affect cash ratios in a significant way for public firms. However, for private firms, in accordance with the finding that a low number of shareholders should be associated positively with cash ratios, the existence of a controlling shareholder is found to affect positively and significantly cash ratios. Thus, for public firms, the larger the number of shareholders, the higher the cash ratio, should be, other things equal. The opposite occurs for private firms, for which the lower the number of shareholders, especially when a controlling shareholder exists, the higher the level of the cash ratio should be, ceteris paribus.

The two previous empirical results are in complete contrast between public and private firms, when it comes to the way the number of shareholders are expected to affect cash ratios for the two groups. These results are not considered to be conceptually unexplainable. As far as public firms are concerned, to the extent that a higher number of owners or a more dispersed shareholder base is associated with weaker governance (Opler *et al.*, 1999), results

are in accordance with Pinkowitz *et al.* (2006) and Dittmar and Mahrt-Smith (2007) on weak governance affecting positively cash.

But, in the case of private firms, the expectation was that the existence of a controlling shareholder could positively affect cash for precautionary reasons, or alternatively be a sign of possibly problematic governance, with minority shareholders being readily squeezed out, in the line of reasoning by Nagar *et al.* (2011). Findings confirm that the existence of a controlling party or of a few shareholders positively affects cash, attributed to either precautionary considerations or governance frictions.

Overall, in the case of private firms, there is observed both a positive impact of cash flows generated internally on cash ratios (from Table 3), as well as a tendency of a low number of shareholders or of a controlling shareholder to accumulate cash (Table 4) when private firms frequently have a few owners or a controlling shareholder. Both these two influences are found to affect positively the cash ratios of private firms, and the exact opposite (negative influence e.g. of cash flow on cash) is testified for public firms. These influences, positively affecting cash for private firms, should in theory result in higher cash ratios for these firms, ceteris paribus, compared to public ones: this is, though, the opposite of what is found: these findings are interpreted as further confirmation a very strong influence of the factors previously testified to negatively affect cash for private firms: Capex, leverage, and possible inability of private firms to increase their cash ratios because they are not simply able to generate enough cash to save from.

5.3. Financial Constraints and Cash Ratios – Public vs. Private Firms

Previous research has shown that cash is more valuable for financially constrained firms (Almeida *et al.*, 2004; Faulkender and Wang, 2006). Research has also testified that some financially constrained firms hold unusually low levels of cash (Denis and Siblikov, 2010), To formally assess whether the listing status of a firm works independently with respect to

influencing cash ratios, in comparison to traditionally used financial constraints by previous literature, there are added proxies for financial constraints to the model in Equation 1. In specific, there are employed four (C1, C2, C4 and C5) out of five constraints defined in Section 3, by adding financial constraint dummy variables (CD) to Equation 1 according to these four identified constraints. When C1 (based on dividend payout ratios) is used, the dividend paying dummy is not included as a separate regressor in the equation.

Financial constraint definitions follow from previous literature, as described for the results presented in Table 2. In the case of C1 (dividend payout ratio) and C5 (firm size) if the firm belongs to the relevant top three deciles for the year in question, it is defined as unconstrained, and CD takes the value of 0, following the definition of constraints of Almeida *et al.* (2004) and Denis and Siblikov (2010). In the case of C2, and C4, if the firm does not satisfy the constraint, CD is set equal to 0. Table 5 Panel A reports the regression results using constraint C1, Panel B for C2, Panel C for C4, and finally Panel D for constraint C5. There are also reported the *p-values* of the test Priv X = Pub X for the results in each Panel.

Insert Table 5 here.

Results from Table 5 (Panels A to D) first suggest that the firm's status constitutes, on a stand-alone basis, a factor with a significant impact on cash ratios; the significance of this explanatory variable (PUB dummy) remains even after controlling for the impact of financial constraints (C1, C2, C4, and C5) on cash ratios. The PUB dummy variable is positive and gets strongly significant coefficients no matter which constraint proxy is employed each time. Results in Panel B are robust to replacing C2 with the previously used C3 in Table 2.

Overall, finding from Table 5 suggest that the public vs. private status is a factor working autonomously in the determination of corporate cash ratios. In other words, financial constraint proxies used by previous literature have a separate impact on cash ratios compared to the public vs. private firm status control. However, public, rather than private firm listing

status is found to positively affect cash, which is inconsistent with the expectation that a more restricted access to capital should positively affect cash. This last result is considered to be generally consistent with previous evidence on unexpectedly low cash ratios for financially constrained firms (Denis and Siblikov, 2010), and overall interpretation of the findings from Tables 3 to 5.

5.4. The Impact of Cash on Future Operating Performance

Following Mikkelson and Partch (2003) and Harford *et al.* (2008) who associated excess levels of cash with future operating performance, the next step is to assess the impact of excess cash on future operating performance for public and private firms. To examine the impact of unexplained cash for the operating performance of public and private firms, the following panel data regression is estimated for public and private firms during 2001-2009:

$$ROE\ at\ t+1 = a_1 + a_2 \times PUB + a_3 \times CASH + a_4 \times TD + a_5 \times LnTA + a_6 \times ROE + a_7 \times NWC + a_8 \times CPX + a_9 \times StDIndCF + a_{10} \times DIVD + a_{11} \times CSHD + a12 \times DISTRESS \quad \text{(Equation 2)}$$

ROE is Return on Equity or Net Income/Positive Shareholders' Equity[7]. CASH refers to excess cash holdings. This equals the residuals from a model in which Cash/TA is regressed on TD/TA, ROE, LnTA, CF/TA, NWC/TA, CPX/TA, DIVD using panel data for public and private firms separately, to control for unexplained cash and unexplained changes in cash (untabulated results). The use of residuals to estimate excess cash, by running a regression in which cash levels are regressed on control variables follows directly from Mikkelson and

[7] Mikkelson and Partch (2003) and Harford *et al.* (2008) relate excess cash to operating (not market, as this is not applicable when using a private firm sample) performance. The use of ROE as a proxy for operating performance is justified by the fact that it unites profitability and investment into a single profitability measure, and cash does not directly interfere with its definition, as would be the case with Return on Assets (ROA), for which the asset amount can be calculated by including or excluding cash. Nonetheless, for robustness purposes, all results have been repeated with the use of ROA (untabulated results) with no qualitative changes. As the sample period is quite small due to the data availability issues for longer time periods described in previous sections, there is made use of ROE only for the next period, and long term profitability is not examined.

Partch (2003) and Harford *et al.* (2008). All variables are defined as elsewhere in the paper. In specific, DISTRESS is a variable taking the value of 1 if EBITDA/Financial Expenses < 1 for two consecutive years or <0.8 for any year. The choice of control variables generally follows from Harford *et al.* (2008). Regressions are run using heteroskedasticity robust standard errors. There were also added year dummies, and industry sector dummies for 17 industry sectors as for Equation 1 (not reported).

Equation 2 is estimated by including controls for corporate governance characteristics (the existence of a controlling shareholder) and the differential impact of financial distress on performance for the two groups (robustness checks involve removing these variables, with no qualitative changes). This is because these factors were observed in the previous analyses to significantly affect the cash ratios of both groups. Table 6 reports regression results for Equation 2 and also the *p-values* of the test Priv X = Pub X, performed for the regression coefficients.

Insert Table 6 here.

Table 6 shows that the coefficient of the PUB regressor is negative and significant, suggesting that private firm status benefits profitability in terms of ROE, at least, in comparison to public firm status. This is overall consistent with evidence from Table 2, that ROE, or profitability as a percentage of equity investment, is higher for private vs. public firms, despite the fact that the profit margins of private firms are lower. Debt is found to be not significant for the profitability of public firms, but it observed to be a strongly negative and significant contributor for ROE for of private firms. Size is found to relate negatively and significantly to future ROEs for private firms, but its effect on the ROEs of public firms is not significant. The coefficient for past ROE and DIVD is positive and significant for both groups, when NWC has a positive and significant coefficient for public, but not private firms. The cash flow volatility of the industry is observed to negatively and significantly affect the

profitability for public firms, but this result is not significant among private firms. Finally, CPX is observed to have no influence on future ROEs for either group.

More importantly, the excess cash variable is found to be not statistically significant for public firms, but in the case of private firms, the same variable gets a coefficient which is both positive and significant at 5% level, indicating that unexplained cash levels relate positively to future profitability for private firms. In other words, unexplained cash has no effect on future profitability for public firms, consistent with the findings by Mikkelson and Partch (2003) for large cash holders, but for private firms, holding excessive amounts of cash is observed to positively affect future performance. This result is interpreted as possible manifestation of the constraints in raising capital of private firms, compared to public ones. As these firms may not have equal opportunities in securing funding, they would naturally have to generate and accumulate cash internally to advance future growth, as accesses to external sources of funds is naturally more difficult than for public firms. In that case, holding excess levels of cash in one year could indicate expansion in process, and thus excess cash associates positively to future profitability. This evidence is also considered to be in accordance with evidence by Bigelli and Sanchez Vidal (2011) for Italian firms, indicating that cash rich private firms tend to invest more in medium-term horizons. The positive sign of the coefficient for excess cash for private firms is in contrast with the relevant result by Harford *et al.* (2008) who testify a negative relation between unexplained cash and future industry-adjusted profitability. However, this finding was observed for a public firm sample, when the result of this study is testified for private firms, which due to governance characteristics and constraints in raising capital, differ from public firms in ways related to cash policies. Finally, controls for corporate governance and financial distress confirm the strong statistical significance of both these controls for the two groups.

Results from Table 6 also show that the values of the coefficients between the two groups do not differ for debt, but do differ for firm size, net working capital, industry cash flow volatility and for the dividend paying dummy, and governance and distress regressors. An unexpected result is observed for the coefficient of the excess cash regressor, as it gets a non-significant *p-valu*e for the test Priv X = Pub X; the issue remains, though, that PUBCASH for public firms is not found to significantly affect future ROEs, when PRIVCASH is observed to do so for private ones[8].

6. Conclusions

This study investigates into the reasons behind differences in the cash ratios of public vs. private firms, as previous studies for the US (Gao *et al.*, 2011) and the UK (Brav, 2009) have testified that the cash ratios of private firms are markedly lower. This last observation comes into contrast with the expectation for more intense precautionary motives for private firms, as their listing status naturally constrains access to capital. Furthermore, as the listing status of a firm may naturally represent a constraint with respect to raising capital, the study additionally controls for the impact of financial constraints and distress on the differential levels of the cash ratios, by simultaneously taking into account the listing status of the firm as an additional constraint. Finally, given observed differences in the cash ratios of the two groups, there is examined the impact of unexplained cash for future operating performance.

By employing a comprehensive sample of public and private UK firms during 2001-2009, findings overall suggest that the differences in the cash ratios of public vs. private firms are

[8] Results from Tables 3 to 6 have been subject to a number of robustness checks. These include adding GDP growth, market volatility and acquisition regressors, decomposing debt into current and long term components, excluding some of the regressors e.g. CPX or ROE from Equation 2, or rerunning regressions with the cash dependent variable at *t+1* when not reported, with no qualitative changes in comparison to the results reported. Robustness checks also include running regressions separately for public and private firms, with no qualitative differences in the direction of the results (however, only results according to the methodology used by Brav (2009) are reported, as the Pub (Priv) X empirical specification permits accounting for the effect of firm listing status). Robustness controls finally include replacing the CF variable with cash flow from operations (CFO) from the cash flow statement, with no qualitative changes on the sign of the cash flow regressor for public vs. private firms.

the result of differences and different sensitivities to leverage, capital expenditures and cash flows. When simultaneously controlling for the impact of firm listing status and other proxies of financial constraints on cash ratios, there is testified that listing status is a significant explanatory factor of the level of cash holdings. This result is interpreted as an indication that firm listing status *per se* represents a significant determinant of cash policy, well and above financial constraints observed by previous research with an ability to influence cash ratios.

In addition, it is found that for private, but not public, firms, internally generated cash flow positively affects their cash ratios. This finding is interpreted as evidence on strong precautionary motives for private firms, and is considered consistent stronger precautionary motives for constrained vs. unconstrained firms, to the extent that listing status affects cash ratios as any constraint in capital access may do.

There is additionally found a positive relation between the number of shareholders and cash holdings for public firms, and a significantly negative relation between shareholder number and cash for private firms. For the latter group, there is also observed a positive association between the existence of a controlling shareholder and cash. This result is considered to be an indication of increased importance of precautionary motives behind the cash holdings of private firms, but cannot discard the possibly of problematic corporate governance affecting cash as well.

Overall, it is found that that private firms exhibit a positive propensity to save cash out of cash flows internally generated, and also have the tendency to accumulate cash at the presence of a controlling shareholder (which is the most frequent case for these firms) but still get cash ratios lower than the ones of public firms. The lower cash ratios of private firms are therefore tentatively attributed to the high strength of the factors discussed. An alternative explanation could be the possible inability of private firms to generate enough cash in the first place, following the findings by Denis and Siblikov (2010) for some financially constrained firms.

This latter argument is considered to be receiving additional support from the fact that descriptive statistics indicate that private firms are overall less profitable than public ones.

Finally, on the impact of cash holdings on future firm profitability, it is found that excess or unexplained cash holdings relate positively and significantly to future operating performance for private, but not public firms. This finding is interpreted in the form of a possible manifestation of relative constraints faced by private firms with respect to raising capital: private firms may have to generate and accumulate cash internally in order finance growth, as this funding is not as easy to secure externally as would be for public firms, so, excess cash in one year could be an indication that the firm secures capital in order to fund growth in a future period.

The contributes to the literature on corporate cash policies on several grounds. First, while previous literature has reported lower cash ratios for private firms (Brav, 2009; Gao *et al.*, 2011) there is provided a statistically significant explanation about why private firms have lower cash ratios than public firms, by making use of the differential impact of factors with a known influence on cash; despite evidence on strong precautionary motives for private firms, these differences are attributed into differences in leverage, capital expenditure decisions, and consistent with a difficulty from the side of private firms to generate enough cash flow so as to increase cash. Second, it is shown that listed vs. unlisted firm status significantly affects cash ratios even after controlling for financial constraints, implying that other types of mechanical, in addition to performance-related, obstacles in raising capital e.g. the existence of a developed debt market as opposed to having to rely purely on bank financing, should be expected to work in the same way. Third, there is provided an illustration of the implications of agency considerations on the formation of corporate cash policy, independently from the capital structure decision, for private and public firms. Finally, the study comparatively

examines the implications of cash holdings for future operating performance for private and public firms, as the two groups naturally face differential capital raising constraints.

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Table 1: Descriptive statistics for public and private firms

Panel A: Public Firms	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2001-2009**
Cash/TA	0.0638	0.0675	0.0639	0.0761	0.0857	0.0773	0.0766	0.0649	0.0744	0.0725***
EBITDA/Sales	0.0719	0.0764	0.0793	0.0800	0.0861	0.0903	0.0939	0.0823	0.0775	0.0825***
EBITDA/TA	0.0844	0.0919	0.0912	0.0970	0.0942	0.0993	0.0966	0.0860	0.0817	0.0910***
TD/TA	0.1811	0.1898	0.1804	0.1665	0.1724	0.1786	0.1854	0.2059	0.1928	0.1841***
LTD/TA	0.1096	0.1205	0.1241	0.1141	0.1170	0.1234	0.1323	0.1388	0.1294	0.1235
CD/TA	0.0489	0.0493	0.0418	0.0365	0.0376	0.0371	0.0358	0.0433	0.0409	0.0404***
CPX/TA	0.0352	0.0323	0.0263	0.0279	0.0226	0.0256	0.0274	0.0449	0.0179	0.0287***
Dividend %	0.6336	0.6196	0.6228	0.6234	0.5557	0.5532	0.5427	0.5441	0.4670	0.5649***
Mean/Median No Shareh.	36.647	25.000								
Firms and % with a CSH	103	0.0767								
Obs	535	560	578	624	691	770	820	873	878	6,329
Panel B: Private Firms	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2001-2009**
Cash/TA	0.0430	0.0438	0.0448	0.0459	0.0471	0.0481	0.0481	0.0483	0.0532	0.0473
EBITDA/Sales	0.0539	0.0522	0.0512	0.0542	0.0523	0.0532	0.0546	0.0472	0.0498	0.0520
EBITDA/TA	0.0938	0.0891	0.0859	0.0890	0.0849	0.0849	0.0856	0.0774	0.0811	0.0853
TD/TA	0.2889	0.2850	0.2849	0.2858	0.2899	0.2882	0.2902	0.2987	0.2679	0.2866
LTD/TA	0.0966	0.0987	0.1047	0.1067	0.1094	0.1142	0.1149	0.1240	0.1219	0.1105
CD/TA	0.1472	0.1416	0.1374	0.1354	0.1368	0.1364	0.1356	0.1366	0.1177	0.1354
CPX/TA	0.0251	0.0230	0.0208	0.0204	0.0197	0.0186	0.0191	0.0187	0.0140	0.0195
Dividend %	0.3465	0.3482	0.3630	0.3610	0.2651	0.3021	0.3119	0.2935	0.3053	0.3188
Mean/Median No Shareh.	2.670	2.000								
Firms and % with a CSH	34,640	0.7111								
Obs	17,943	19,286	20,349	21,362	22,626	25,075	26,613	27,021	27,171	207,446

Table 1 reports median information according to year and during 2001-2009 as a whole for public (Panel A) and private (Panel B) firms for Cash/TA, EBITDA/Sales, EBITDA/TA, LTD/TA, CD/TA, CPX/TA, % of observations which report dividends. The table also reports information on the mean and median number of shareholders and % of firms for which there exists a controlling shareholder, and finally number of observations according to year. Current Debt (CD) represents current loans and Total Debt (TD) equals Current debt + long term debt (LTD). All variables employed for private firms were truncated at 0.1% at both sides of the distribution. Information on the number of firm-year observations refers to observations satisfying the sample selection criteria. In Panel A, there are further reported results after performing the Wilcoxon/Mann-Whitney test for the relevant median ratio values between public and private firms for the period 2001-2009. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 2: Descriptive statistics for constrained public and private firms

Panel A: Descriptive statistics for public and private firms										
	EBITDA/S	Cash/TA	TD/TA	LTD/TA	CD/TA	EBITDA/FinExp	CF/TA	ROE	Sales	TA
Public Firms										
	0.0822	0.0719	0.1822	0.1225	0.0400	5.305	0.0679	0.0734	61,200	64,809
Private Firms										
	0.052	0.0473	0.2866	0.1105	0.1354	6.0331	0.0702	0.1342	10,105	6,920
Panel B: Descriptive statistics for constrained public and private firms										
Constrained Public Firms										
C1	0.1383	0.0619	0.1819	0.1297	0.0321	10.3028	0.1512	0.0997	147,655	149,672
C2	-0.2441	0.0993	0.1565	0.0812	0.0464	-10.057	-0.3777	-0.1556	4,697	11,198
C3	-0.2826	0.1024	0.1493	0.0739	0.0458	-12.2684	-0.4085	-0.1749	4,281	9,779
C4	0.0371	0.0735	0.1819	0.1074	0.0463	1.8441	-0.0259	0.0236	18,659	29,306
C5	0.0023	0.108	0.131	0.0585	0.0509	0.1652	-0.0571	-0.0143	4,723	6,302
Constrained Private Firms										
C1	0.0877	0.0479	0.2046	0.0956	0.0815	10.555	0.182	0.1021	14,788	9,311
C2	-0.0361	0.0375	0.4884	0.1849	0.2451	-3.425	-0.1374	-0.0363	7,443	6,347
C3	-0.0456	0.0394	0.4782	0.1698	0.2516	-4.4355	-0.1584	-0.0459	7,143	5,830
C4	0.0314	0.0378	0.4134	0.1634	0.1867	2.1062	0.0521	0.0367	9,668	7,609
C5	0.0432	0.0643	0.2426	0.0782	0.1355	8.2428	0.2076	0.089	2,742	1,415

Table 2 reports information on 2001-2009 median values for EBITDA/Sales (EBITDA/S; Cash/TA, TD/TA, LTD/TA, EBITDA/Financial expenses, ROE, Cash flow/TA (CF/TA) and Sales and Total Assets (TA) (in £000) for the sample public and private firms (Panel A) and for constrained public and private firms (Panel B) according to five constraints. ROE equals Net Income/Positive Shareholders' Equity and Cash flow/TA (CF/TA) is (Profit for the period+Depreciation)/TA. Current Debt (CD) represents current loans and Total Debt (TD) equals Current debt + long term debt (LTD). There are 5 constraints employed: C1: including firms belonging to the bottom three dividend payout (dividends/operating income) annually rebalanced deciles, calculated for public and private firms separately, C2: including firms with EBITDA/Financial Expenses < 1 for two consecutive years or <0.8 for any year, C3, including firms with EBITDA/Financial Expenses <0.5 for any year, C4: including firms with negative net income, and finally C5: including firms belonging to the bottom three size (TA) annually rebalanced deciles, calculated for public and private firms separately. C1 and C5 follow from Almeida *et al.* (2004), C2 and C3 from Asquith *et al.* (1994) and Andrade and Kaplan (1998) and C4 from Bates *et al.* (2009).

Table 3: Explanation of cash ratios - differentiating between the factors affecting public and private firms

Panel A: Dependent Variable = Cash/TA							**Panel B: Dependent Variable = Next year Cash/TA**					
Variable	Coef	*t*-Stat		Test Priv X = Pub X			Coef	*t*-Stat		Test Priv X = Pub X		
C	0.133	12.52	***				0.141	11.69	***			
PUB	0.144	8.11	***				0.090	4.96	***			
PUBTD	-0.222	-15.68	***	TD	0.000	***	-0.182	-12.82	***	TD	0.001	***
PUBROE	0.003	0.93		ROE	0.705		-0.002	-0.67		ROE	0.195	
PUBLNTA	-0.011	-9.34	***	LNTA	0.000	***	-0.008	-6.89	***	LNTA	0.001	***
PUBCF	-0.055	-2.75	***	CF	0.000	***	-0.014	-0.71		CF	0.000	***
PUBNWC	-0.140	-10.09	***	NWC	0.076	*	-0.081	-5.74	***	NWC	0.802	
PUBCPX	-0.060	-1.98	**	CAPEX	0.094	*	-0.032	-0.98		CAPEX	0.170	
PUBStDIndCF	0.211	1.92	*	StIndCF	0.001	***	0.087	0.77		StIndCF	0.069	*
PUBDIVD	-0.009	-1.95	*	DIVD	0.064	*	-0.011	-2.35	**	DIVD	0.053	*
PRIVTD	-0.146	-63.90	***				-0.133	-49.75	***			
PRIVROE	0.004	5.10	***				0.002	2.43	**			
PRIVLNTA	-0.004	-10.31	***				-0.004	-8.96	***			
PRIVCF	0.118	14.94	***				0.103	11.60	***			
PRIVNWC	-0.115	-54.49	***				-0.084	-33.04	***			
PRIVCPX	-0.112	-21.46	***				-0.077	-12.93	***			
PRIVStDIndCF	0.750	3.83	***				0.412	1.83	*			
PRIVDIVD	0.000	-0.24					-0.002	-1.50				
Adj R-sq.	0.150						0.114					
F-stat.	327.343						180.479					
Prob(F)	0.000		***				0.000		***			
Obs	75,947						55,608					

Table 3 reports regression results for the following panel data regression run for public and private firms together during 2001-2009: Cash or Next year Cash = $a_1 + a_2$*PUB + a_3* TD + a_4* ROE + a_5* LnTA + a_6*CF + a_7*NWC + a_8*CPX+a_9* StDIndCF +a_{10}*DIVD. Cash equals Cash/TA, PUB is a dummy variable equal to 1 if the firm is public and 0 if private, TD is (Current+ long term debt)/TA, LNTA equals Ln of Total Assets, ROE is Net Income/Positive Shareholders' Equity, CF is (Profit for the period + Depreciation)/TA, NWC is net working capital (Stocks + Debtors-Creditors)/TA., and CPX equals Capital Expenditure/TA. StDIndCF equals median industry cash flow volatility, calculated as the median standard deviation of Cash flow/TA (defined as previously) for the industry during 2001-2005 and 2006-2009, according to 17 industry sectors (sector grouping presented in the Appendix). DIVD is a dummy variable taking the value of 1 if the firm gives dividends and 0 otherwise. Following Brav (2009), Pub X (Priv X) is the variable X interacted with a dummy equal to one (zero) if the firm is public and zero (one) if private. Regressions are run using Heteroskedasticity robust standard errors. There were also added year dummies, and industry sector dummies for 17 industry sectors (not reported). Panel A reports results when the dependent variable is Cash/TA and Panel B for Next year Cash/TA. There also reported the *p-values* of the test Priv X = Pub X next to every regression results, performed for the regression coefficients.*, **, and *** indicate significance at 10%, 5% and 1%, respectively.

Table 4: Explanation of cash ratios with the inclusion of controls for corporate governance characteristics

	Dep Var: Cash/TA		Test Priv X = Pub X			Dep Var: Cash/TA		Test Priv X = Pub X		
Variable	Coef	*t*-Stat				Coef	*t*-Stat			
C	0.134	10.83***				0.130	10.41***			
PUB	0.150	7.94***				0.154	8.20***			
PUBTD	-0.198	-13.94***	TD	0.008	***	-0.197	-13.83***	TD	0.008	***
PUBROE	0.003	1.07	ROE	0.629		0.003	1.07	ROE	0.617	
PUBLNTA	-0.021	-12.18***	LNTA	0.000	***	-0.021	-11.96***	LNTA	0.000	***
PUBCF	-0.050	-2.53**	CF	0.000	***	-0.050	-2.52**	CF	0.000	***
PUBNWC	-0.140	-10.00***	NWC	0.154		-0.140	-9.96***	NWC	0.167	
PUBCPX	-0.093	-2.91***	CPX	0.542		-0.092	-2.87***	CPX	0.536	
PUBStDIndCF	0.128	1.10	StDIndCF	0.003	***	0.132	1.13	StDIndCF	0.003	***
PUBDIVD	-0.016	-3.29***	DIVD	0.002	***	-0.016	-3.30***	DIVD	0.002	***
PRIVTD	-0.159	-54.53***	NOSH	0.000	***	-0.159	-54.53***	NOSH	0.000	***
PRIVROE	0.005	4.43***				0.005	4.49***	CSHD	0.325	
PRIVLNTA	-0.003	-6.49***				-0.003	-6.72***			
PRIVCF	0.128	12.27***				0.128	12.27***			
PRIVNWC	-0.120	-45.52***				-0.120	-45.62***			
PRIVCPX	-0.112	-17.21***				-0.112	-17.19***			
PRIVStDIndCF	0.674	2.96***				0.670	2.95***			
PRIVDIVD	-0.001	-0.53				0.000	-0.24			
PUBNOSH	0.031	8.32***				0.030	8.11***			
PRIVNOSH	-0.005	-6.79***				-0.003	-4.02***			
PUBCSHD						-0.003	-0.31			
PRIVCSHD						0.006	5.43***			
Adj R-sq.	0.165					0.165				
F-stat.	230.232					220.759				
Prob(F)	0.000	***				0.000	***			
Obs	49,928					49,928				

Table 4 reports regression results for the following panel data regression run for public and private firms during 2001-2009: Cash = a_1 + a_2*PUB + a_3* TD + a_4* ROE + a_5* LnTA + a_6*CF + a_7*NWC + a_8*CPX+a_9* StDIndCF +a_{10}*DIVD +a_{11}*NOSH +a_{12}+CSHD. Cash is Cash/TA, PUB is a dummy variable equal to 1 if the firm is public, 0 if private, TD is (Current+long term debt)/TA, LNTA equals Ln of Total Assets, ROE is Net Income/Positive Shareholders' Equity, CF is Cash Flow/TA, NWC is net working capital/TA, and CPX equals Capital Expenditure/TA. StDIndCF equals median industry cash flow volatility, calculated as the median standard deviation of Cash flow/TA for the industry during 2001-2005 and 2006-2009, according to 17 industry sectors (sector grouping presented in the Appendix). DIVD is a dummy variable taking the value of 1 if the firm gives dividends and 0 otherwise. NOSH is the natural logarithm of the number of shareholders, and CSHD is a dummy variable taking the value of 1 if there exists a controlling shareholders, and 0 otherwise. Following Brav (2009), Pub X (Priv X) is the variable X interacted with a dummy equal to one (zero) if the firm is public and zero (one) if private. Regressions are run using Heteroskedasticity robust standard errors. There were also added year dummies, and industry sector dummies for 17 industry sectors (not reported). There are reported regression coefficients for all variables, and values of t statistics, values for F statistics and their respective *p-values*, Adjusted R squared values and number of observations. All variables included were additionally truncated at 0.5% at both sides of the distribution, for public and private firms separately. There also reported the *p-values* of the test Priv X = Pub X next to every regression results, performed for the regression coefficients.*, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 5: Explanation of cash ratios accounting for constraints - differentiating between the factors affecting public and private firms

Panel A: C1 based on dividend payout ratios							**Panel B: C2 based on interest cover ratios**					
	Dep Var: Cash/TA						Dep Var: Cash/TA					
Variable	Coef	*t*-Stat		Test Priv X = Pub X			Coef	*t*-Stat		Test Priv X = Pub X		
C	0.097	4.95	***				0.130	12.23	***			
PUB	0.161	7.10	***				0.133	7.51	***			
PUBTD	-0.226	-14.40	***	TD	0.001	***	-0.222	-15.71	***	TD	0.000	***
PUBROE	0.003	0.87		ROE	0.182		0.003	0.86		ROE	0.526	
PUBLNTA	-0.010	-8.19	***	LNTA	0.000	***	-0.010	-8.83	***	LNTA	0.000	***
PUBCF	-0.055	-2.76	***	CF	0.000	***	-0.039	-1.79	*	CF	0.000	***
PUBNWC	-0.141	-8.91	***	NWC	0.633		-0.135	-9.96	***	NWC	0.136	
PUBCPX	-0.036	-1.12		CAPEX	0.001	***	-0.058	-1.91	*	CAPEX	0.091	*
PUBStDIndCF	0.402	2.52	**	StIndCF	0.035	**	0.187	1.70	*	StIndCF	0.001	***
PUBDIVD				CD	0.085	*	-0.005	-1.02		DIVD	0.265	
PRIVTD	-0.172	-33.23	***				-0.147	-64.21	***	CD	0.260	
PRIVROE	0.008	3.31	***				0.005	5.80	***			
PRIVLNTA	-0.002	-2.04	**				-0.004	-9.90	***			
PRIVCF	0.272	17.10	***				0.135	15.81	***			
PRIVNWC	-0.133	-30.14	***				-0.115	-54.29	***			
PRIVCPX	-0.148	-12.75	***				-0.111	-21.19	***			
PRIVStDIndCF	0.941	2.73	***				0.718	3.66	***			
PRIVDIVD							0.001	0.57				
PUBCD	-0.010	-1.88	*				0.022	2.56	**			
PRIVCD	-0.020	-9.20	***				0.012	8.28	***			
Adj R-sq.	0.207						0.151					
F-stat.	120.898						314.383					
Prob(F)	0.000		***				0.000		***			
Obs	18,889						75,947					

Table 5 –Continued - Panels C and D

Panels C: C4 based on negative income					**Panel D: C5 based on firm size**				
	Dep Var: Cash/TA				Dep Var: Cash/TA				
Variable	Coef	*t*-Stat	Test Priv X = Pub X		Coef	*t*-Stat	Test Priv X = Pub X		
C	0.134	12.59***			0.149	9.36***			
PUB	0.150	8.37***			0.147	3.43***			
PUBTD	-0.221	-15.63***	TD	0.000***	-0.234	-12.37***	TD	0.000	***
PUBROE	0.003	0.97	ROE	0.734	0.004	1.10 *	ROE	0.767	
PUBLNTA	-0.011	-9.49***	LNTA	0.000***	-0.011	-4.03***	LNTA	0.024	**
PUBCF	-0.057	-2.89***	CF	0.000***	-0.071	-2.83***	CF	0.000	***
PUBNWC	-0.141	-10.15***	NWC	0.066*	-0.115	-6.81***	NWC	0.874	
PUBCPX	-0.064	-2.09**	CAPEX	0.116	-0.055	-1.50	CAPEX	0.056	*
PUBStDIndCF	0.226	2.06**	StIndCF	0.001***	0.184	1.19	StIndCF	0.065	*
PUBDIVD	-0.012	-2.49**	DIVD	0.020**	-0.011	-1.69*	DIVD	0.225	
PRIVTD	-0.146	-63.59***	CD	0.097*	-0.129	-40.31***	CD	0.380	
PRIVROE	0.004	5.06***			0.005	4.44***			
PRIVLNTA	-0.004	-10.32***			-0.005	-6.02***			
PRIVCF	0.116	14.63***			0.109	10.06***			
PRIVNWC	-0.115	-54.53***			-0.113	-37.14***			
PRIVCPX	-0.113	-21.55***			-0.127	-16.07***			
PRIVStDIndCF	0.761	3.89***			0.597	2.25**			
PRIVDIVD	-0.001	-0.55			-0.003	-1.95*			
PUBCD	-0.016	-2.73 ***			-0.013	-0.87			
PRIVCD	-0.006	-5.06 ***			0.000	0.09			
Adj R-sq.	0.150				0.153				
F-stat.	312.977				149.018				
Prob(F)	0.000	***			0.000	***			
Obs	75,947				35,146				

Table 5 reports regression results for Equation 1 with the addition of a financial constraint dummy variable (CD). CD is a dummy variable equal to1 if the firm is constrained, and 0 if unconstrained. There are used four proxies for constraints: C1: for firms belonging to the bottom three dividend payout deciles, C2: for firms with EBITDA/Financial Expenses < 1 for two consecutive years or <0.8 for any year, C4: for firms with negative net income and C5: for firms belonging to the bottom three size (TA) deciles (portfolios are annually rebalanced and have been calculated separately for public and private firms). For C1and C5, if the firm belongs to the relevant top three deciles for the year in question, it is defined as unconstrained and CD takes the value of 0. For C2 and C4, if the firm does not satisfy the constraint, CD equals 0. When C1 (based on dividend payout ratios) is used, there is not made use of a dividend paying dummy regressor. All other variables are defined as in previous analyses. Following Brav (2009), Pub X (Priv X) is the variable X interacted with a dummy equal to one (zero) if the firm is public and zero (one) if private. Regressions are run using Heteroskedasticity robust standard errors. There were also added year dummies, and industry sector dummies for 17 industry sectors (not reported). Panel A reports regression results for C1, Panel B for C2, Panel C for C4 and Panel D for C5. *P-values* of the test Priv X = Pub X for regression coefficients are also reported. *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Table 6: Effect of excess cash on future operating performance

Dependent Variable: ROE at *t+1*	Coef	*t*-Stat		Test Priv X = Pub X		
C	0.241	3.37	***			
PUB	-0.435	-2.38	**			
PUBCASH	-0.198	-0.44		CASH	0.467	
PUBTD	0.163	0.97		TD	0.209	
PUBROE	0.189	2.77	***	ROE	0.515	
PUBLNTA	0.014	1.06		LNTA	0.032	**
PUBNWC	0.368	2.93	***	NWC	0.002	***
PUBCPX	-0.436	-1.39		CAPEX	0.160	
PUBStDIndCF	-2.177	-2.08	**	StIndCF	0.100	*
PUBDIVD	0.170	4.27	***	DIVD	0.021	**
PRIVCASH	0.129	5.46	***	CSHD	0.017	**
PRIVTD	-0.049	-3.04	***	DISTRESS	0.005	***
PRIVROE	0.235	13.72	***			
PRIVLNTA	-0.015	-7.03	***			
PRIVNWC	-0.016	-1.33				
PRIVCPX	0.007	0.21				
PRIVStDIndCF	0.028	0.02				
PRIVDIVD	0.077	15.41	***			
PUBCSHD	0.113	2.82	***			
PRIVCSHD	0.016	3.26	***			
PUBDISTRESS	-0.364	-4.45	***			
PRIVDISTRESS	-0.133	-11.69	***			
Adj R-sq.	0.110					
F-stat.	153.218					
Prob(F)	0.000		***			
Obs	54,317					

Table 6 reports regression results for the following panel data regression run for public and private firms together during 2001-2009: ROE at *t+1* = $a_1 + a_2$*PUB + a_3*CASH+ a_4* TD + a_5* ROE + a_6*LnTA + a_7*NWC + a_8*CPX+a_9* StDIndCF +a_{10}*DIVD +a_{11}*CSHD + a_{11}*DISTRESS. ROE is Net Income/Positive Shareholders' Equity. CASH equals the residuals from a model in which Cash/TA is regressed on TD/TA, ROE, LnTA, CF/TA, NWC/TA, CPX/TA, DIVD. PUB is a dummy variable equal to 1 if the firm is public and 0 if private, TD is (Current+long term debt)/TA, LNTA equals Ln of Total Assets, NWC is net working capital/TA, and CPX equals Capital Expenditure/TA. StDIndCF equals median industry cash flow volatility, calculated as the median standard deviation of Cash flow/TA for the industry during 2001-2005 and 2006-2009, according to 17 industry sectors (defined as in text). DIVD is a dummy variable taking the value of 1 if the firm gives dividends and 0 otherwise. CSHD is a dummy variable taking the value of 1 if there exists a controlling shareholders, and 0 otherwise. DISTRESS is a variable taking the value of 1 if EBITDA/Financial Expenses < 1 for two consecutive years or <0.8 for any year. Following Brav (2009), Pub X (Priv X) is the variable X interacted with a dummy equal to one (zero) if the firm is public and zero (one) if private. Regressions are run using Heteroskedasticity robust standard errors. There were also added year dummies, and industry sector dummies for 17 industry sectors (not reported). There are also reported the *p-values* of the test Priv X = Pub X for the regression run . *, **, and *** indicate statistical significance at 10%, 5% and 1%, respectively.

Appendix

17 sectors constructed following Cohen and Zarowin (2010) with assignment of the 2-digit codes not included in their 16 sectors grouping into one of 16 sectors, plus constructing a 17th sector consisting of firms from the services industry.

Study Sector Codes	Sector Names	Corresponding 2-digit SIC codes
1	Oil and gas	10, 12, 13, 14, 29
2	Food products	01, 02, 07, 08, 09, 20
3	Paper and paper products	24-27
4	Chemical products	28
5	Manufacturing	21-23, 30-34
6	Computer equipment and services	35, 73
7	Electronic equipment	36
8	Transportation	37, 39, 40-45, 47
9	Scientific instruments	38
10	Communications	48
11	Electric, gas, and sanitary services	49
12	Durable goods	15-17, 46, 50-51
13	Retail	52-57, 59
14	Eating and drinking establishments	58
15	Entertainment services	70, 78,79, 84
16	Health	80
17	Services	72, 75, 76, 81-83, 86-88