CORPORATE CASH HOLDINGS: EVIDENCE FROM A DIFFERENT INSTITUTIONAL SETTING

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Abstract

This paper investigates the determinants of Swiss non-financial firms' cash holdings over the 1995 to 2004 period. The median Swiss firm holds almost twice as much cash and cash equivalents as the median UK or US firm. Our results indicate that there is a negative relationship between asset tangibility and cash holdings and a non-linear relationship between leverage and cash holdings. Dividend payments are positively related to cash reserves. However, there is no robust impact of firm size on cash. We also cannot detect a significantly positive relationship between growth opportunities (measured by the market-to-book ratio) and cash holdings, suggesting that the financing hierarchy theory is of little importance for the liquidity planning of Swiss firms. Dynamic panel estimation reveals that Swiss firms adjust their cash holdings only slowly towards an endogenous target cash ratio. Looking at a firm's corporate governance structure, we reveal a non-linear relationship between managerial ownership and cash holdings, indicating an incentive alignment effect and an opposing effect related to increasing risk aversion. Finally, our results indicate that firms where the CEO at the same time serves as the COB hold significantly more cash.

Keywords: Cash holdings, corporate governance, dynamic adjustment.

JEL classification codes: G32.

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1 Introduction

Swiss firms, on average, hold much larger cash reserves than firms in most other countries [1]. The median cash ratio of a sample of 156 Swiss non-financial publicly-listed firms varies in a range between 10% and 15% over the period from 1995 to 2004. DITTMAR et al. (2003) compare the median cash ratios of firms from 45 countries, and in only seven countries the median firm holds more cash than the median Swiss firm. However, there are not only significant differences in cash holdings across countries, but also between firms within countries. While differences in cash holdings between firms from different countries are strongly related to the countries' financing practices and/or legal structures (e.g., shareholder protection rights), OPLER et al. (1999) document that differences between firms within a country are largely attributable to fundamental characteristics (e.g., firm size, profitability, growth opportunities, and asset tangibility).

In addition, firm-level corporate governance structures could have an impact on the amount of cash reserves. For example, using a sample of UK firms, OZKAN and OZKAN (2004) document that managerial ownership, board composition, and ownership concentration influence cash holdings. The peculiar characteristics of the Swiss corporate governance system allow another interesting test of whether agency problems between managers and shareholders affect a firm's cash reserves. For example, in contrast to the Cadbury Report in the UK, the "Swiss Code of Best Practice" does not explicitly require that the role of the chief executive officer (CEO) and the chairman of the board (COB) are separated. Rather, it merely requires firms to "provide for adequate control mechanisms" if "for reasons specific to the company or because the circumstances relating to availability of senior management makes it appropriate", the firm decides to combine the two functions [2]. While separation of the chief executive officer and the chairman of the board is common in the UK, the US is at the other extreme of leadership structures, where CEO duality is the prevailing model (e.g., DAHYA and TRAVLOS, 2000). Therefore, Switzerland is an interesting case to analyze, because it can be regarded as falling between these two prototype models of leadership. More generally, given that most empirical studies of the relationship between a firm's cash holdings and its control structures relate to the US and/or the UK with their market-based corporate governance structures, it is interesting to explore this relationship for a continental European country (in this case Switzerland). In spite of its relatively large stock market capitalization, Switzerland is an example for an insider-based system. Furthermore, the prevailing control structures will affect firms' financial policies and, hence, the decision to hold more or less liquidity.

In a frictionless world, a firm would not have to hold cash. There is no optimal cash level, and a firm could wait and immediately raise outside funds whenever internal funds are insufficient to fund projects. In reality, frictions will be responsible that cash holdings in fact do matter. A firm with sufficient cash holdings will not have to forego some positive net present value projects because of market imperfections, transaction costs, or asymmetric information. In addition, cash holdings reduce the probability of financial distress. In contrast, cash may itself be part of the agency problem within firms, weakening market discipline and increasing the entrenched CEO autonomy. Managers can have incentives to hold a large cash reserve in order to pursue their own objectives at the expense of those of shareholders (e.g., consumption of perquisites and/or making inefficient investments). Given that the theoretical predictions are ambiguous, it therefore remains an empirical question whether cash holdings can be explained by a precautionary or optimal financial planning motive rather than by managerial opportunism (e.g., FAULKENDER and WANG, 2005).

In this paper, we discuss the motives to hold cash and derive testable hypothesis. Our empirical tests employ an unbalanced panel of 156 publicly-listed Swiss firms over the period from 1995 to 2003. We use fixed and random effects panel models to analyze the determinants of the cash ratio. Our results indicate that the amount of a firm's cash reserves is strongly related to leverage and asset tangibility and, to a minor extent, to firm size, profitability, and payout policy. Extending the static

model, we estimate the speed of adjustment towards an endogenous target cash ratio in a dynamic panel model. The estimated speed of adjustment coefficient of Swiss firms is between 0.35 and 0.5, implying that, ceteris paribus, the difference between the observed cash ratio and the target is reduced by 35-50% per year. Finally, we analyze the impact of corporate governance variables on cash holdings. Our results seem to suggest that a higher percentage of managerial ownership leads to lower cash holdings, indicating reduced agency conflicts between managers and shareholders. In contrast, when managerial ownership becomes large (in absolute terms), cash holdings increase. We interpret this result as reflecting managers' risk aversion. In addition, CEO duality is associated with higher cash holdings.

The remainder of this paper is as follows. Section 2 provides a brief survey about the prior (theoretical and empirical) literature on cash holdings. The first part of section 3 contains a data description and develops our main hypotheses. The second part of section 3 presents the results from standard and dynamic panel models. Section 4 discusses the results of simple cross-sectional regressions involving cash holdings and a set of corporate governance variables. Finally, section 5 concludes.

2 Motives for cash holdings

In perfect capital markets, there is no reason for a firm to hold liquid assets. If cash flows are unexpectedly low, a firm can raise external funds at fair prices to keep operating and to invest into positive net present value projects. Assuming that there are no liquidity premiums and no negative tax-effects if a firm borrows money and accumulates liquidity, shareholders' wealth remains unchanged. Even if one believes that an optimal capital structure exists, it only applies to *net* debt, defined as debt minus cash. Cash is merely negative debt and there is no optimal amount of cash. Changes in internal resources are the driving force for changes in cash holdings, but it is a matter of indifference whether a firm uses internal resources to accumulate cash and/or to repay debt (e.g., MYERS and MAJLUF, 1984; OPLER et al., 1999).

Viewed from the opposite direction, if there is an optimal amount of cash, frictions must explain why a firm might not regard external finance as a perfect substitute for internal finance. The literature on corporate cash holdings emphasizes two major motives for holding liquidity: (i) the transaction costs motive, and (ii) the precautionary motive. The transaction costs motive recognizes that raising external funds involves fixed and variable costs. The fixed cost component induces a firm to raise external funds only infrequently and to hold cash as a (costly) buffer. Therefore, for a given amount of net debt, there is an optimal amount of cash to be raised. In contrast, the precautionary motive relates to information asymmetries, agency costs, and the opportunity costs of foregone investments. If the adverse selection costs of external finance and/or the costs of financial distress are prohibitively high, firms accumulate liquidity to meet unanticipated cash shortfalls and finance their positive net present value investments.

2.1 Transaction costs

In the presence of transaction costs, a value-maximizing firm evaluates the marginal costs and marginal benefits of cash holdings to determine an optimum (e.g., KEYNES, 1936). On the one hand, economies of scale for raising external funds encourage firms to hold cash as a buffer and avoid frequent external fund raising (LEE et al., 1996; KIM et al., 1998). On the other hand, the cost of holding liquidity is its lower pecuniary return. In the presence of transaction costs, a part of the benefits from holding liquid assets is that they can more easily be converted into cash, i.e., there is a liquidity premium, defined as the opportunity cost for holding liquid assets. In addition, there is a tax disadvantage from a shareholder's point of view. If a firm holds liquid assets, the accrued interest income is taxed twice and shareholders could earn a higher pre-tax return from holding these securities directly (e.g., MASULIS and TRUEMAN, 1988).

The transaction costs motive leads to several predictions about a firm's cash holdings. For example, the existence of economies of scale suggests that smaller firms hold relatively more liquidity than larger firms. One way to raise cash is through liquidation of assets (SHLEIFER and VISHNY, 1992). A firm holding assets that can be cheaply converted into cash can raise funds at low cost by selling these assets. Therefore, firms with a high degree of asset specificity tend to have higher cash holdings. A related hypothesis is that larger firms are generally more diversified and can liquidate assets in non-core segments, allowing them to hold less liquidity (OPLER et al., 1999). Finally, a shorter cash conversion cycle implies better timing of incoming and outgoing payments, requiring smaller cash positions. In addition, firms with shorter cash conversion cycles tend to be diversified firms with multiple product lines, also suggesting that these firms hold less cash. In contrast, however, DELOOF (2001) argues that a longer cash conversion cycle reduces the need to hold liquidity because more receivables and inventories can quickly be converted into cash.

2.2 Information asymmetries and agency costs of debt

Information asymmetries

MYERS and MAJLUF (1984) suggest that asymmetric information between managers and investors make external financing costly. In the presence of adverse selection costs, securities may be mispriced and firms prefer internal over informationally sensitive external finance. If adverse selection costs become extreme, a firm may find it more profitable not to sell securities and even forego investments. Therefore, it is valuable to build up financial slack (MYERS, 1984). This motive for holding cash is subsumed under the precautionary motive (OPLER et al., 1999) or the financing motive (DELOOF, 2001).

There are two potential implications of the existence of adverse selection costs. If they are interpreted merely as an additional cost of raising capital, then a firm still faces a trade-off between the costs and the benefits of holding cash. In contrast, if one assumes that the costs of external financing are prohibitive a firm will generally avoid financing investments with external capital and accumulate cash. In this case, however, there is no target cash level. If the cost of holding cash is incorporated, i.e., the low return earned on liquid assets and increasing agency cost, there is only an upper bound from which on it is too costly to hold more cash.

To avoid excessive adverse selection costs and being forced not to invest, firms with higher information asymmetries will hold more cash. Most important, firms whose values are mainly determined by growth options should have larger cash reserves to avoid foregoing some investment opportunities. Growth opportunities are intangible assets by their nature, implying that growth firms incur higher bankruptcy costs and that their value decreases sharply in financial distress or bankruptcy (e.g., WILLIAMSION, 1988; HARRIS and RAVIV, 1991; SHLEIFER and VISHNY, 1992). This notion also supports the hypothesis that firms with high research and development expenses have more incentives to avoid financial distress, and they therefore tend to hold larger amounts of cash. In addition, transaction costs should be lower for firms that are stronger monitored and have better access to the capital markets. External monitoring is possibly stronger for dividend paying firms, and it might therefore be easier for them to raise funds. Alternatively, they could also cut dividends, implying lower cash holdings. However, a competing hypothesis is that dividend payers have a particular incentive to avoid a cash squeeze because they are reluctant to cut dividends (BRAV et al., 2005). Furthermore, larger firms exhibit less pronounced information asymmetries (and lower adverse selection costs) than smaller firms (e.g., BRENNAN and HUGHES, 1991; COLLINS et al., 1981). Smaller firms also face higher costs of external financing than larger ones because they are more likely to face borrowing constraints (e.g., WHITED, 1992; FAZZARI and PETERSON, 1993) and because they cannot exploit the scale economies resulting from a substantial fixed cost component of security issuance cost (e.g., KIM et al., 1998). Assuming that firm size

is an inverse proxy for both the degree of information asymmetry and the cost of external financing, smaller firms can be expected to hold a greater amount of cash than smaller firms. This notion is also justified by the assumption that larger firms are more likely to be diversified and are thus less likely to experience financial distress (TITMAN and WESSELS, 1988).

Agency costs of debt

Agency costs of debt arise when the interests of shareholders differ from those of debtholders and/or when there are diverging interests between various classes of debtholders. Moral hazard problems make it difficult and expensive for highly levered firms to raise additional debt and/or renegotiate existing debt contracts to prevent bankruptcy. JENSEN and MECKLING (1976) argue that these firms have strong incentives to engage in asset substitution, making debt more expensive both in terms of the required yield and in terms of the covenants attached to the debt. Furthermore, highly levered firms will likely suffer from MYERS' (1977) underinvestment problem, where the old shareholders have little incentive to provide additional equity capital even when a firm has profitable investment projects because the cash flows from these investments disproportionately accrue to the creditors. In both cases, agency costs of debt are so high that firms cannot raise funds and forego profitable investment projects.

A simple solution to avoid agency costs of debt is to choose a low level of leverage. PARRINO and WEISBACH'S (1999) simulation results suggest that both the risk shifting and the underinvestment problem increase with additional leverage. Alternatively, OPLER et al. (1999) argue that, holding the degree of information asymmetry between managers and investors constant, firms with high investment opportunities (e.g., as proxied by the market-to-book-ratio) tend to hold more cash because the costs they incur in financial distress are higher. These firms invest a lot and, hence, they hold more cash in order to pay for investments expenditures.

2.3 Agency costs of managerial discretion

Conflicts of interest between managers and shareholders can also relate to a firm's cash holdings. One reason for managers to hold excess cash is that that they are risk-averse (e.g., FAMA and JENSEN, 1983; STULZ, 1988). Managers are not fully diversified because they cannot divide their human capital, and therefore more entrenched managers could hold excess cash to avoid market discipline. JENSEN (1986) argues that in the presence of managerial discretion, managers have incentives to hold large amounts of cash to have more flexibility to pursue their own objectives. Cash allows management to make investments that the capital market would not be willing to finance. Since excess cash holdings allow self-serving managers to avoid the discipline of the capital markets, investing in cash increases the costs of outside financing and can have detrimental effects on firm value.

Empirical studies must employ variables that indicate to which extent a firm's management is disciplined (or not) in order to analyse the relationship between agency costs of managerial discretion and cash holdings. For example, firm size is a takeover deterrent and, hence, larger firms tend to hold more cash. OPLER at al. (1999) suggest that firms with low debt tend to hold more cash because low debt makes the firm less subject to market monitoring. Similarly, STIGLITZ (1985) argues that there is little incentive for small shareholders to monitor managers because the cost of monitoring will likely outweigh the benefits. Therefore, one could hypothesize that firms with dispersed shareholders hold larger amounts of cash. In contrast, the existence of a large shareholder makes a takeover or a proxy contest a credible threat (SHLEIFER and VISHNY, 1986). When a firm has a controlling shareholder, another aspect is that the controlling party can appropriate private benefits not shared by other shareholders (e.g., BARCLAY and HOLDERNESS, 1989; DYCK and ZINGALES, 2004). OZKAN and OZKAN (2004) argue that large shareholders might have an

incentive to increase the funds under their control to consume private benefits at the expense of minority shareholders, e.g., by holding large cash reserves. A closely related hypothesis is that firms with deviations from the one share-one vote principle potentially expropriate minority shareholders, and one way to do so is to hold excess liquidity.

JENSEN and MECKLING (1976) suggest that managerial ownership reduces the incentives for value destroying actions, implying a negative relationship between managerial shareholdings and the amount of cash reserves. At the same time, however, managers are risk averse and less then fully diversified, and they protect themselves from outside pressure by holding excess cash. In fact, OZKAN and OZKAN (2004) document that the relationship between managerial ownership and cash holdings is U-shaped. They explain this result by the opposing influences of an incentive alignment effect and an entrenchment effect.

Another aspect that has increasingly gained interest in the corporate governance literature is the structure of the board of directors, such as board composition, board independence, board size, and the effectiveness of board work (e.g., HERMALIN and WEISBACH, 2003). For example, one may hypothesize that firms with more outside directors on the board are likely to experience a reduction in the agency costs of external finance and therefore hold less cash. Another aspect of outsider- vs. insider-dominated boards of directors is whether the CEO acts simultaneously as the COB. BEINER et al. (2006) document that firms that work under CEO duality elect significantly fewer outside directors into the board, indicating potential conflicts within the boardroom. Therefore, a testable hypothesis is that firms with dual CEOs also tend to hold more cash reserves. Furthermore, JENSEN (1993) and LIPTON and LORSCH (1992) argue that large boards are less effective than small boards, presuming that the emphasis on politeness and courtesy in boardrooms is at the expense of truth and frankness. When boards become too big, agency problems (e.g., director free-riding) increase and the board becomes more symbolic and neglects its monitoring and control duties. Therefore, given YERMACK'S (1996) empirical finding that larger board size leads to lower firm valuation, a testable hypothesis is that firms with larger boards encounter larger agency costs of external finance and hold more cash.

2.4 Previous empirical results

Determinants of cash holdings

In an early study, KESTER (1986) compares the cash holdings of Japanese and US firms. In 1983, the average US firm held only 8.6% of its assets in cash, whereas in Japan the average was 18.7%. More recently, DITTMAR et al. (2003) analyze a sample of more than 11'000 firms from 45 countries. Looking at the median cash ratios, they document a wide cross-country dispersion. In 1998, the median cash ratios ranged from 0.3% in Kenya to 29.6% in Egypt. PINKOWITZ and WILLIAMSON (2001) explain the difference between Japanese and US cash holdings by the monopoly power of Japanese banks that persuade firms to hold large cash reserves. In contrast, DITTMAR et al. (2003) argue that the differences in cash holdings are attributable to differences in the corporate governance structures across countries. They document that firms in countries with poor minority shareholder protection hold up to twice as much cash reserves than firms in countries with strong shareholder protection rights. In contrast, however, the findings of KALCHEVA and LINS (2004) do not support the prediction that cash holdings are more valuable for firms in countries with underdeveloped financial markets. Similarly, HARFORD, MANSI, and MAXWELL'S (2004) report that US firms with weaker shareholder rights tend to have smaller cash reserves. They explain their results with the fact that in the US entrenched managers dissipate cash reserves (primarily on acquisitions) more quickly than managers in other countries.

JOHN (1993) presents evidence for firm-level determinants of cash holdings. Using a sample of 223 US corporations, her results indicate that firms with higher costs of financial distress and higher

cash flow volatility hold significantly more cash, while firms with higher leverage, higher growth rates, a longer cash conversion cycle, and more tangible assets hold less cash. While JOHN (1993) used time averages of all variables, more recent studies have applied panel regression methodology. For example, KIM et al. (1998) analyze a sample of 452 US firms over the 1975 to 1994 period. They document that cash holdings increase with higher market-to-book ratios and cash flow volatility. Their results also reveal that cash holdings decrease with firm size, leverage, the length of the cash conversion cycle, and the probability of financial distress. Finally, they report a significant relationship between measures of future economic conditions and liquidity, implying that firms accumulate cash to be able to undertake future investment opportunities. OPLER et al. (1999) also employ a large sample of US firms and document very similar results. FAULKENDER (2004) analyses small US firms and reports that the determinants of cash holdings are somewhat different. Most important, he finds that small companies tend to hold more cash as their leverage increases, possibly because they have limited access to the capital markets [3].

Recently, several studies have presented evidence from outside the US. For example, using a panel of UK firms, OZKAN and OZKAN (2004) confirm previous findings for the US. KYTÖNEN (2005) and GARCÍA-TERUEL and MARTÍNEZ-SOLANO (2004) analyse Finnish and Spanish firms, respectively, and they document that firm size, growth opportunities, cash flows, leverage, dividend policy, and the probability of financial distress impact cash holdings. FERREIRA and VILELA (2004) investigate firms from the twelve EMU countries. They report that cash holdings are positively affected by growth opportunities and cash flows and negatively affected by asset liquidity, leverage, bank debt, and firm size. Finally, using a sample of Belgian firms DELOOF (2001) documents that a firm's intragroup relations influence the need for liquidity.

Cash, corporate governance, and valuation effects

In an early study, PAPAIOANNOU et al. (1992) argue that there is no significant influence from managerial ownership on US firms' cash holdings. OPLER et al. (1999) also document only a marginal impact from managerial ownership on the amount of cash holdings of US firms. In contrast, OZKAN and OZKAN (2004) report a non-monotonic relationship for U.K. firms. Cash holdings first fall until managerial ownership increases up to 24%, possibly indicating that the alignment effects dominates the entrenchment effect. Beyond this point, cash holdings rise until managerial ownership increases to 64%, and then falls again at higher levels of managerial ownership. They cannot detect a significant influence of the fraction of non-executive directors, a dummy variable for dual CEOs, and the presence of a controlling shareholder on this curvilinear relationship. In contrast, KUSNADI (2004) analyzes Singaporean firms and suggests that board size, insider dominance on the board, and outside blockholders significantly influence the cash ratio. IONA et al. (2004) simultaneously analyze cash reserves and leverage. They treat a firm as financially conservative if it has both low-leverage and high-cash reserves at the same time. Their results suggest that managerial ownership, board composition, and, to some extent, ownership concentration influences the likelihood of firms to adopt a conservative financial policy.

Conservative financial policies are often criticised as serving the interests of managers rather than those of shareholders. Therefore, two further questions arise: First, what happens to excess cash? Second, does excess cash have a negative impact on firm valuation and/or performance? BLANCHARD et al. (1994) document that firms do not pay out cash windfalls from a won or settled lawsuit to shareholders, even if there are no attractive investment opportunities. OPLER et al. (1999) present evidence that excess cash is persistent, but they provide only weak support for the view that positive excess cash induces managers to spend substantially more on investment or acquisitions. In contrast, HARFORD (1999) and HARFORD et al. (2004) conclude that cash-rich US firms are more likely to make acquisitions and that these acquisitions tend to be value decreasing. MIKKELSON and PARTCH (2003) examine the operating performance of firms that maintain a

cash ratio in excess of 25% during five years. They document that following the five-year period the operating performance of high cash firms is comparable or even greater than the performance of matching firms. They conclude that high cash reserves promote investments without hindering corporate performance. Weighting the benefits (avoiding transaction and adverse selection costs) and costs (e.g., double-taxation and managerial entrenchment) of cash, FAULKENDER and WANG (2005) estimate that the average marginal value of cash across all firms is $0.94. However, this value declines with larger cash holdings, higher leverage, and better access to capital markets.

KALCHEVA and LINS (2004) report that shareholders tend to discount the value of firms with strong managerial entrenchment and high cash reserves, especially in countries with poor minority shareholder rights. Similarly, DITTMAR and MAHRT-SMITH (2005) present evidence that the market value of excess cash reserves is reduced by up to one-half when firms are poorly governed. They also document that firms with poor control structures spend excess cash more quickly in poorly performing assets. Finally, COUDERC (2005) investigates the influence of excessive cash holdings on firm performance with a sample of firms from Canada, France, Germany, UK, and the US. His results suggest that cash-rich firms perform worse.

Target cash ratios

OPLER et al. (1999) examine whether cash holdings are mean-reverting. They document negative autocorrelation and conclude that the hypothesis of the existence of a target ratio cannot be rejected. However, they emphasize that mean reversion is not inconsistent with a financing hierarchy model, where cash holdings are *not* actively managed, but the change in cash rather depends on the change in the growth in internal resources. If the growth of internal resources is negatively autocorrelated (e.g., because of business cycle fluctuations), then the cash holdings will also be autocorrelated. BRUINSHOOFD and KOOL (2004) investigate Dutch firms and interpret their results as being consistent with long-run liquidity targets at the firm level. Depending on the empirical methodology, they document that the rates of annual target convergence range from 20% to over 60%. OZKAN and OZKAN (2004) estimate dynamic panel models, and they conclude that firms have implicit liquidity targets. They report an estimated annual adjustment coefficient of 0.6 for UK firms. GUNEY et al. (2003) confirm these results for a sample of firms from the UK, Japan, France, and Germany. Japanese and German firms exhibit the lowest speed of adjustment, which could be explained by their close ties to banks (relationship banking). COUDERC (2005) also documents differences in adjustment coefficients across countries. He estimates higher adjustment coefficients for the US and Canada (over 0.6) than for Germany and France (roughly 0.5). Overall, to some extent these results support the dynamic nature of cash holding decisions, which are characterized by a trade-off between the costs of divergence from the target and the costs of adjustment.

3 Cash holdings of Swiss firms

3.1 Data description

Our sample targets all 227 firms in the Swiss Performance Index (SPI) as of May 2005. We exclude financial institutions because their balance sheet is affected by exogenous factors, i.e., specific rules and regulations according to regulatory laws. In addition, we could not collect the necessary data for many of the smaller firms in the SPI. These adjustments leave us with an unbalanced panel of 156 firms over the period from 1995 to 2004. The data are taken from the Datastream and Worldscope databases. Table 1 shows the descriptive statistics of the variables we employ in our tests, and table 2 exhibits the corresponding correlation matrix. All variables are truncated at the 1% and 99% levels.

[Insert tables 1 and 2 here]

Cash ratio

Swiss firms hold large amounts of cash. For example, in 2003 the 156 non-financial firms for which we have data available held almost 90 billion Swiss francs in cash and cash equivalents. At his time, their assets had a book value of 450 billion Swiss francs, i.e., almost 20% of their total assets represented liquidity. Figure 1 exhibits the median cash ratio of Swiss firms over the sample period from 1995 to 2004. The median Swiss firm holds 11.4% of its total assets as liquidity, whereas the median US and UK firm holds 8.1% and 6.4% cash, respectively (DITTMAR et al., 2003). In an international comparison, therefore, Swiss firms tend to hold high cash reserves. Given that Swiss firms generally have close ties to banks (relationship banking), one could hypothesize that they should hold less cash. Bank monitoring decreases asymmetric information and the incentives for wasteful behaviour on part of the management, and these benefits could potentially eliminate cash hording. In contrast, however, using Japanese data PINKOWITZ and WILLIAMSON (2001) provide evidence that main banks encourage firms in which they act as the principal monitor to hold relatively high levels of cash, predominantly to benefit the bank itself. While we cannot rule out this explanation for our sample of Swiss firms, another explanation could be that firms had easy access to (both short- and long-term) bank debt as a means of financing with relatively low transaction costs. In fact, Swiss banks followed an easy credit policy during the last decade, and the total size of the Swiss credit market is large compared to anglo-saxon countries. For example, the total amount of bank credit granted to the industrial sector (excluding financial firms) is 41% of the Swiss gross domestic product, whereas for the US and the UK the corresponding numbers are 32% and 29%, respectively [4]. A final explanation is based on the observation that Switzerland was not a booming economy during our sample period. In general, therefore, internal funds were sufficient to finance all capital expenditures, and the stable cash flows of many Swiss firms even allowed building up high cash reserves.

[Insert figure 1 here]

In literature there are two common ways to calculate the cash ratio. The first and most common method is to divide cash and cash equivalents by the book value of total assets (e.g., Kim et al., 1998). Other authors follow OPLER et al. (1999) and normalize cash with net assets, i.e., book value of total assets minus cash and cash equivalents. To provide widely comparable results, we use both approaches to calculate the cash ratio. By construction, the first ratio, labelled *CASH*, is lower then the second ratio, denoted as *CASHN*. In fact, the median value in our sample for *CASHN* is 12.9%, as compared to only 11.4% for *CASH* (see table 1)[5]. Three quarters of our Swiss firms have a cash ratio (*CASH*) below 20 percent. However, there are firms in our sample that hold up to 90 percent of their assets as cash and cash equivalents. According to a Jarque-Bera test (Jarque and Bera, 1980), both *CASH* and *LNCASHN* are not normally distributed. One way to alleviate problems from non-normality in panel regressions is to use the natural logarithm of the ratio. As an example, figure 2 shows the histograms of *CASH* and *LNCASHN* together with the Jarque-Bera test statistic. Truncating the data at the 1% and 99% levels, the null hypothesis that *LNCASHN* is normally distributed cannot be rejected.

[Insert figure 2 here]

Explanatory variables

Firm size, denoted as *LSIZE1*, is measured as the natural logarithm of the market value of a firm's equity (in thousand Swiss francs) in 2004. The median sample firm has a market capitalisation of CHF 300 million. Alternatively, we use the natural logarithm of a firm's total assets to measure firm size, labelled *LSIZE2*. The expected relationship between firm size and cash holdings is ambiguous. In the presence of scale economies, it is relatively cheaper for large firms to issue securities (e.g.,

BARCLAY and SMITH, 1995). In addition, large firms exhibit less information asymmetries than small firms, and therefore they face lower costs of external financing (e.g., BRENNAN and HUGHES, 1991; FAZZARI and PETERSEN, 1993). OZKAN and OZKAN (2004) argue that large firms hold less cash because they are more likely to be diversified and, hence, less likely to experience financial distress (e.g., TITMAN and WESSELS, 1988). In contrast, larger firms presumably were more successful and, hence, they have been able to accumulate higher cash reserves (e.g., OPLER et al., 1999). Furthermore, firm size can be regarded as a takeover deterrent. Managers of large firms have more discretionary power to hold excess cash without fearing a potential takeover. Because of the underdeveloped Swiss takeover market, the relevance of this hypothesis seems negligible.

Leverage, labelled *LEV*, is measured as a firm's total debt (short and long-term debt) divided by total assets. This measure only includes interest-bearing liabilities (RAJAN and ZINGALES, 1995). The leverage of half of our observations ranges from 12% to 35%. There are a few firms in our sample with over-indebtedness or without debt at all. There are several arguments in the literature suggesting that higher leverage should reduce cash holdings. In a pecking order world, debt grows when investment exceeds retained earnings and falls when investment is less than retained earnings. Cash holdings follow an inverse pattern of evolution, i.e., cash decreases when investment exceed retained earnings, and vice versa. This relationship between cash holdings, debt, and investment suggests that there is a negative relationship between leverage and cash holdings. In addition, firms with better access to the debt markets and/or bank loans have less need to hold cash. Finally, high leverage firms are more subject to investor monitoring, implying limited managerial discretion and lower cash holdings. In contrast, higher leverage increases the probability of financial distress and could therefore induce firms to hold more cash (e.g., OZKAN and OZKAN, 2004). In addition, high leverage provokes MYERS' (1977) underinvestment problem, and holding excess cash minimizes the potential agency costs of debt. From a theoretical point of view, therefore, the predicted relationship between leverage and cash holdings is ambiguous.

We use three different measures for a firm's dividend payments. First, we simply differentiate if a firm pays dividends by using a dummy variable, *DIVDUM*, that takes a value of one if the firm pays dividends in the given year, and zero otherwise. Second, we calculate the payout ratio, labelled *POR*, defined as dividends per share divided by earnings per share. Third, we calculate the dividend yield, denoted as *DIVYIELD*, defined as the dividend per share divided by the year-end stock price. As shown in table 1, in our sample 75% of the firms are dividend payers. The median dividend yield is only 2.18%. One hypothesis is that dividend paying firms are better monitored and can raise funds at lower cost. The possibility to reduce dividend payments in case of a liquidity shortage also justifies lower cash holdings by dividend paying firms. However, it is equally reasonable to argue that dividend payers are particularly reluctant to omit dividends and, hence, they tend to hold larger amounts of cash (e.g., OZKAN and OZKAN, 2004). In addition, the observation that a firm pays dividends may be the result of better corporate governance practices, which implies that dividend payers hold less cash.

Profitability, denoted as *PROFIT*, is defined as the operating profit divided by total assets. On the one hand, more profitable firms use their profits to build up liquidity and, hence, they tend to hold more cash. On the other hand, profits provide an immediate source of liquidity. If cash and profits are substitutes, there should be a negative relationship.

To estimate a firm's growth opportunities, we use its market-to-book ratio, denoted as *MTBR*. As shown in table 2, the median value of *MTBR* in our sample is 1.5. The cost of incurring a cash shortage is higher for firms with larger investment opportunities due to the expected losses that result from foregoing valuable investment opportunities. In addition, growth firms are characterised by a higher degree of information asymmetry, and it is more costly for them to raise external funds.

Both arguments suggest a positive relationship between cash holdings and the market-to-book ratio. In contrast, however, growth firms may simply not have sufficient cash flows to be able to accumulate, implying a negative relationship between cash holdings and the market-to-book ratio. Viewed from an agency perspective, entrenched managers of firms with poor investment opportunities are expected to hold higher cash reserves to invest, even if the net present value of the available projects is negative.

The cost of liquidation is higher for a firm that sells unique or specialized products (e.g., TITMAN, 1984). Accordingly, these firms should have an incentive to hold more cash reserves. We follow JOHN (1993) and use the expenditures on research and development over sales, labelled *RD*, as a proxy for product uniqueness and the potential cost of financial distress. For firms without declaration, *RD* is assumed to be zero. Alternatively, we employ a dummy variable, *RDDUM*, taking on the value of one if a firm's reported expenditure on research and development is greater than zero for a given year, and zero otherwise. Only 42 percent of the firms in our sample explicitly state that they invest into research and development activities.

Following KIM et al. (1998), we use the inverse of an adjusted version of ALTMAN'S (1968) Z-score (*1/ZSCORE*) as a proxy of the probability of financial distress. Compared to the original version of the Z-score, we exclude a measure of liquidity to avoid circularity, i.e., to avoid that the cash ratio is explained by itself [6]:

$$Z\text{-}score = 3.3 \times \frac{EBIT}{Total\ assets} + 1.0 \times \frac{Sales}{Total\ assets} + 1.4 \times \frac{Retained\ earnings}{Total\ assets} + 0.6 \times \frac{Market\ value\ equity}{Book\ value\ total\ debt}.$$

KIM et al. (1998) predict a negative relationship between cash holdings and *1/ZSCORE*, implying that firms with a higher probability of financial distress hold less cash. A negative relationship could also be interpreted as support for JENSEN'S (1986) hypothesis that financial pressure reduces the agency costs of free cash flow. However, the direction of causality is ambiguous, and an equally plausible prediction is that firms with a high probability of financial distress attempt to hold high cash reserves.

We use the ratio of fixed assets to total assets, denoted as *TANGF*, as a proxy for asset tangibility. The median firm in our sample has 39% of its assets invested in fixed assets. Firms with more tangible assets can be expected to hold less cash. Tangible assets can be sold in the case of a cash shortfall. In addition, firms with more collaterals encounter fewer problems to issue debt (e.g., TITMAN and WESSELS, 1988), and therefore they have less need to build up high cash reserves. To double-check our results, we also compute the ratio of receivables to total assets (*TANGR*) and the ratio of inventory to total assets (*TANGI*). High values of the latter two variables indicate that firms can quickly convert assets into cash, e.g., by factoring the receivables.

The final variable we use to explain cash holdings is the length of the cash conversion cycle, denoted as *CASHCC*. This variable is defined as [7]:

$$CASHCC = \frac{Receivables}{Sales} \times 360 + \frac{Inventories}{Cost\ of\ sales} \times 360 + \frac{Accounts\ payable}{Total\ operating\ expensures}.$$

The median length of the cash conversion cycle of Swiss firms is 124 days, as shown in table 1. As discussed in section 2 above, one could hypothesize a negative or a positive relationship between the cash conversion cycle and the cash ratio. On the one hand, a shorter cash conversion cycle implies better timing of cash flows, justifying smaller cash positions. On the other hand, a longer cash conversion cycle implies more receivables and inventories that could quickly be converted into cash.

3.2 Results of panel regression tests

Table 3 presents the estimation results of our baseline panel regression model, where *CASH* is the dependent variable. For each model, we report the results from both fixed effects and random effects regressions. The fixed effects estimator focuses on the differences within firms, whereas the random effects estimator also exploits the information of differences between firms. To distinguish between fixed and random effects, we report a HAUSMAN (1978) test statistic for each model specification. The null hypothesis is that the fixed and random effects estimators do not differ. Rejection of the null hypothesis is usually interpreted as evidence for the presence of fixed effects. All regression specifications include additional year dummies to control for variables that are constant across firms but evolve over time. The combined time-fixed and firm-fixed effects model eliminates an omitted variables bias arising both from unobserved variables that are constant over time and from unobserved variables that are constant across firms. To save space, we omit reporting the corresponding coefficients in table 3. All variables are again truncated at the 1% and 99% levels. The standard errors of the estimated coefficients are corrected for heteroscedasticity using the WHITE (1980) methodology.

Instead of discussing every model specification in detail, we provide an overview of our most important results that are robust across all regressions. Our first result is that there is a negative relationship between firm size (*LSIZE1* and *LSIZE*2) and cash holdings. This observation is consistent with the hypothesis that it is relatively cheaper for larger firms to raise external funds. It does not support the notion that managers of large firms have more discretionary power over investments and financial policies, inducing them to hold a greater amount of cash. A second result is the negative relationship between leverage (*LEV*) and cash holdings. This supports the pecking order theory, where cash holdings fall when investments exceed retained earnings and debt grows due to its lower adverse selection cost compared to equity. This result is also in line with the widely-held presumption that higher leverage implies better monitoring and reduced managerial discretion. However, when we include a quadratic term of leverage, we find that the relationship between leverage and cash holdings is curvilinear. Specifically, the estimated coefficient on *LEV^2* is significantly positive. This result is consistent with the hypothesis that the probability of experiencing financial distress increases with leverage, inducing managers to hold more cash due to a precautionary motive. For highly levered firms, contingent claims analysis (MERTON, 1974) predicts that almost all firm value is in the hands of the debt holders. A small increase in cash reserves goes largely to increasing debt value, not equity value and implies that the probability of bankruptcy decreases [8].

[Insert table 3 here]

The coefficients on all proxy variables for asset tangibility (*TANGR*, *TANGI*, and *TANGF*) are estimated significantly negative. This result is consistent with our hypothesis that tangible assets can be sold if a cash shortfall occurs and that firms with more collaterals encounter fewer problems to issue debt. We also uncover a positive relationship between our dividend dummy variable (*DIVDUM*) and cash holdings [9]. This result is consistent with the hypothesis that dividend payers are particularly reluctant to omit dividends, and they therefore tend to hold larger amounts of cash (e.g., OZKAN and OZKAN, 2004). In addition, in one regression model the coefficient on the inverse of ALTMAN'S (1968) Z-score (*1/ZSCORE*) is estimated significantly negative. This result is in line with JENSEN'S (1986) hypothesis that financial pressure reduces the agency costs of free cash flow. Finally, there is weak evidence for a negative relationship between the length of the cash conversion cycle (*CASHCC*) and cash holdings. This observation could be explained along DELOOF'S (2001) notion that a longer cash conversion cycle increases receivables and inventories that could easily be converted into cash.

We also document two negative results. Most important, and in contrast to other empirical studies (e.g., FERREIRA and VILELA, 2004), growth opportunities (as measured by *MTBR*) are estimated insignificantly in all four regression models. In addition, there is no reliable evidence for a relationship between profitability and cash holdings.

To test the robustness of our results, we use logarithm of our alternative definition of the cash ratio cash (*LNCASHN*) as the dependent variable. Table 4 contains the estimation results. The results remain qualitatively similar, and we therefore omit a more detailed discussion.

[Insert table 4 here]

3.3 Dynamic panel data estimation

In this section, we extend the static cash holding model and formulate a partial (dynamic) adjustment model. An implicit assumption in the static model is that a firm can instantaneously adjust towards the target cash level in response to changes in firm-specific characteristics and/or random shocks. In the presence of adjustment costs, however, it may not even be optimal for a firm to immediately adjust towards the target cash level [10]. Costly adjustment leads to a delay in the adjustment process, and therefore a firm's observed cash ratio is not necessary identical with the desired cash ratio. Following OZKAN and OZKAN (2004), we estimate a dynamic panel model, where the first lag of the dependent variable (i.e., the natural logarithm of the cash ratio) is used as an explanatory variable [11]. In general, this class of model allows analyzing whether current behaviour depends upon past behaviour. In our context, the specific model describes the dynamics of cash holdings by estimating the speed of adjustment towards an endogenously determined target cash ratio.

As in OZKAN and OZKAN (2004), we assume that there exists an unobservable target cash ratio, denoted as $CASH^*$, which is a function of firm-specific characteristics and a disturbance term. Specifically, the target cash ratio of firm *i* at time *t* is modelled as follows:

$$(1) \qquad CASH_{it}^{*} = \sum_{k} \beta_k x_{kit} + \varepsilon_{it} ,$$

where there are *k* firm-specific characteristics suggested by theory. Actual and target cash ratios may diverge, and during each period firms partially adjust towards their target cash ratio. The speed of this adjustment process is captured by a constant adjustment coefficient, denoted as λ, hence, the adjustment dynamics are modelled as:

$$(2) \qquad CASH_{it} - CASH_{i,t-1} = \lambda\left(CASH_{it}^{*} - CASH_{i,t-1}\right).$$

Plugging equation (1) for the (time-varying) target cash ratio into equation (2) for the adjustment dynamics delivers the following expression for a firm's actual cash ratio at time *t* as a function of the lagged cash ratio at time *t-1* and contemporaneous firm-specific variables:

$$(3) \qquad CASH_{it} = \gamma_0 CASH_{i,t-1} + \sum_{k} \gamma_k x_{kit} + \alpha_i + \alpha_t + \mu_{it} ,$$

with $\gamma_0 = 1-\lambda$, $\gamma_k = \lambda\beta_k$, and $\mu_{it} = \lambda\varepsilon_{it}$, and where α_i and α_t denote firm-specific and time-specific effects, respectively. Most important, the estimated value of $\lambda = 1-\gamma_0$ measures the speed of adjustment towards an endogenous (time-varying) target cash ratio, which is computed as $\sum_k \gamma_k x_{kit}$. An adjustment speed of 1 would indicate that firms instantaneously adjust towards their target cash ratio, i.e., $CASH_{it} = CASH_{i,t}^{*}$. In contrast, an adjustment speed of 0 implies that adjust-

ment costs are excessively high, preventing firms from active adjustments in their cash holdings, i.e., $CASH_{it} = CASH_{i,t-1}$ [12].

In a dynamic panel model, a problem arises from the inclusion of lagged dependent variables. Since $CASH_{it}$ is a function of α_i, it immediately follows that $CASH_{i,t-1}$ is also a function of α_i. Therefore, $CASH_{i,t-1}$, a right-hand regressor in equation (3), will be correlated with the error term, implying that an ordinary least squares estimator is biased and inconsistent. In addition, shocks that jointly affect the cash ratio and the explanatory variables could lead to endogeneity problems due to an omitted variables bias. To address these problems, we use ARELLANO and BOND'S (1991) Generalized Method of Moment (GMM) dynamic panel estimator [13]. They show that first differencing the dynamic model in equation (3) produces an equation that can be estimated by instrumental variables. Using all possible lagged vectors of the right-hand side variables as instruments, their methodology exploits the orthogonality conditions that exist between these instrument variables and the disturbance term of the differenced equation. The resulting GMM estimator is asymptotically efficient and accounts for arbitrary heteroscedasticity. However, estimation problems incur from autocorrelation in the residuals. While AR(1) autocorrelation of the error term in first differences does not affect the properties of the GMM estimator, AR(2) autocorrelation leads to inconsistent estimators.

Dynamic panel estimators have one-step and two-step variants, depending on the iteration process involving the quadratic form of the weighting matrix and the coefficient estimates. In our estimations, we encounter significant second-order error correlations based on the one-step GMM estimator, implying that the corresponding coefficients are inconsistent. Theoretically, two-step estimators are asymptotically more efficient than one-step estimators, but their estimates of the standard errors are biased downward in small samples (ARELLANO and BOND, 1991). To address this issue, we employ the two-step procedure and use the finite sample correction to the covariance matrix, as it has been recently suggested by WINDMEIJER (2005).

Table 5 shows the estimation results for the dynamic panel model, where we treat all explanatory variables as exogenous (expect the lagged cash ratio). For all regression specifications, we present HANSEN'S (1982) chi-square test statistic for the null hypothesis that the dynamic model's overidentifying restrictions are valid ("goodness-of-fit"), i.e., that the estimated orthogonality conditions are sufficiently close to zero. The null hypothesis cannot be rejected in any of the four model specifications, which supports the choice of all lagged dependent variables from the second lag onward as valid instruments.

[Insert table 5 here]

As shown in table 5, the estimated speed of adjustment coefficient for Swiss firms, $\lambda = 1 - \gamma_0$, ranges between 0.35 and 0.50. The strong statistical significance of the estimated coefficients emphasizes that it is important to take the dynamic characteristics of cash holdings into account. With regards to the magnitude of the estimated coefficient, we find that the speed of adjustment of Swiss firms is, on average, lower than for US and UK firms (e.g., see OZKAN and OZKAN, 2004; COUDERC, 2005). On the one hand, this result suggests that the cost of being off target is lower in Switzerland than in anglo-saxon countries. On the other hand, it may suggest that adjustment costs are relatively more expensive in Switzerland than in other countries. On a basic level, the slow speed of adjustment of Swiss firms is consistent with their propensity to hold high levels of cash. Firms with slow adjustment towards their target cash ratio must hold higher cash reserves in order to avoid cash shortfalls that might require costly adjustments. Another explanation is the dependence of Swiss firms on banks for external financing and the accompanying easy credit policy of domestic banks during the last decade. Because banks serve as monitors, firms can adjust slowly towards their target cash level without incurring high agency costs. Another explanation is again based on the observation that Switzerland did not experience a booming economy during our sample period. In

general, internal funds were sufficient to finance all capital expenditures, and with few good investment opportunities to come up (and a generally low probability to fall short of cash), it was not costly to deviate from the target cash ratio.

In addition to the estimates for the adjustment coefficients, table 5 also presents the estimates for the determinants of the (endogenous) target cash ratio. Most of the results are qualitatively similar to those in tables 3 and 4, but somewhat less pronounced. For example, the impact of firm size on cash holdings is no longer estimated significantly. There are three additional noteworthy changes. First, two of our regression models indicate that profitability (*PROFIT*) negatively impacts cash holdings. This supports the view that cash and profits are substitutes, i.e., profits provide a major source of liquidity. Second, we estimate a positive influence of *DIVYIELD* on cash holdings, i.e., firms that pay relatively higher dividends tend to hold more cash. This result confirms our previous finding that dividend payers do not view dividends as a source of finance but rather avoid a dividend curtailment due to costly signalling. And third, there is weak evidence that increased research and development activities (*RD*) lead to larger cash holdings, as could be hypothesized by theory.

4 Corporate governance and cash holdings

In this section, we analyse the influence of firm level corporate governance structures on cash holdings. Because we do not have time-series data for most of the relevant corporate governance variables, we run simple cross-sectional regressions. As the dependent variable, we use the natural logarithm of our firms' net cash ratio (*LNCASHN*) as of year-end 2003. To account for potential endogenity problems, the firm-specific variables described in section 2 above are taken as four year averages from 1999 to 2002 (e.g., see RAJAN and ZINGALES, 1995). In simple cross-sectional regressions we also use constant variables that would have been eliminated in fixed effects regressions. Specifically, we include dummy variables for a firm's sector classification according to Swiss Exchange. In addition, we use the standard deviation of operating cash flows normalized by total assets (*CFV*). To compute this variable, we use data for at least five consecutive years before 2003 (with a maximum of eight years). Most important, we include several corporate governance variables as right-hand side variables [14]. Due to data limitations, the sample we use for our cross-sectional regressions only covers 118 firms. The cash ratio is observed in 2003 and is truncated at the 5% and 95% levels. Table 6 provides a detailed data description for the remaining 107 firms.

[Insert table 6 here]

Our first corporate governance variable is the total shareholding of a firm's management (cumulated voting rights, including board members) as a percentage of total shares (*MOWNER*). To the extent that holding cash is costly, and assuming that managerial ownership aligns the interests of managers with those of shareholders (JENSEN and MECKLING, 1976), one would expect a negative relationship between managerial shareholdings and cash holdings. In addition to this incentive alignment effect, lower expected agency costs increase a firm's ability to raise external funds and reduce the need to hold large cash reserves. However, with very high shareholdings of managers, they may eventually become entrenched as they gain control over the firm and do not have to fear active monitoring by outside shareholders (e.g., JENSEN, 1986). This entrenchment effect –in combination with the incentive alignment effect – implies a U-shaped relationship between managerial ownership and cash holdings. As in OZKAN and OZKAN (2004), we test this hypothesis by including a quadratic term of *MOWNER* into our regressions. To test higher non-linearities, we also include a cubic term.

An additional hypothesis is that very high managerial ownership makes managers risk-averse (FAMA and JENSEN, 1983). To test this notion, we also include the absolute value of managerial shareholdings (i.e., *MOWNER* multiplied by *LNSIZE*) as an additional explanatory variable. If risk

aversion induces owner-managers to hold more cash, one would expect a positive relationship between the interaction term *MOWNER*LNSIZE* and cash holdings.

To capture a firm's ownership structure, we also include the percentage of voting rights of the largest shareholder, denoted as *LSHARE*. In addition, the variable *BLOCK* is the percentage of cumulated voting rights exercised by true outside blockholders, i.e., non-group listed companies, mutual funds, and pension funds with voting rights exceeding 5%. One would expect large outside blockholders to be in a position to enforce the interests of shareholders and force firms to reduce excessive cash holdings. Depending on the identity of the largest shareholder, the relationship between his ownership stake in the firm and cash holdings can be positive or negative, depending on whether the largest shareholder gains private benefits from holding cash or exerts his control function (to the benefit if minority shareholder), respectively. Deviations from the one share-one vote principle also offer opportunities to expropriate minority shareholders, and one possibility is to hold excess cash. Therefore, we include a dummy variable labelled *SCAT*, which takes on the value of one if a firm has more then one share category, and zero otherwise.

To test whether the structure of the board of directors affects a firm's cash holdings, we include a dummy variable, denoted as *CEOCBO*, which is one if the CEO simultaneously acts as the CBO, and zero otherwise. A testable hypothesis is that firms with dual CEOs serve the interests of the management team. One way to protect its position is to hold excessive cash. We also test whether larger boards with a presumably less effective decision making process hold more cash. The variable *BSIZE* measures the number of directors serving on the board.
Table 7 presents our results. All reported standard errors are corrected for heteroscedasticity using the WHITE (1980) covariance matrix. The negative coefficient on *MOWNER* indicates that managers who own a high percentage of a firm's shares have an incentive to reduce cash holding. This negative relationship between managerial ownership and cash holdings can be explained by an incentive alignment effect. Although the coefficient on *MOWNER^2* is positive, indicating a U-shaped relationship as suggested by theory, it is not statistically significant. The cubic term *MOWNER^3* is also estimated insignificantly. However, the coefficient on the interaction term *MOWNER*LNSIZE* is significantly positive, indicating that managers' risk aversion increases with higher absolute values of their ownership stakes, and this induces them to hold higher cash reserves. Overall, therefore, managerial ownership influences the cash ratio in two opposite directions. On the one hand, a higher percentage of ownership alleviates the conflict of interest between shareholders and managers, implying lower cash ratios. On the other hand, cash holdings increase when the absolute value of managerial ownership is very high.

[Insert table 7 here]

Our estimations further reveal that CEO duality leads to significantly higher cash holdings. The magnitude of the estimated coefficient on *CEOCOB* indicates that, on average, the cash reserves of a firm with a dual CEO exceeds the (net) cash ratio of a firm with separated functions of the CEO and the COB by more than 30%. This result seems to support the hypothesis that one way for an insider-dominated board to protect its own position is to hold more cash.

For all other corporate governance variables, i.e., board size, ownership stakes of the largest shareholder and outside blockholders, and types of share categories, we cannot detect a significant relationship with cash holdings. Finally, there is no evidence supporting the hypothesis that more volatile cash flows, which potentially increase the probability of financial distress, lead to higher cash holdings.

5 Conclusions

We examine the holdings of cash and cash equivalents of 156 non-financial Swiss firms over the 1995 to 2004 period. A main result of our analysis is that the median Swiss firm has substantially higher cash reserves than firms from most other countries. We also observe significant influences from various firm-specific variables on cash holdings, and our findings support different hypotheses derived from theory. According to the transaction cost motive, firms face a trade-off between the costs and benefits of holding cash. The strong negative relationship between asset tangibility and the cash ratio indicates that firms with assets that can easily be liquidated hold less cash to minimize the opportunity costs of holding cash. The observation that firms with higher leverage tend to hold less cash supports the idea that the opportunity costs of holding cash increase with leverage. In addition, we find some evidence for the hypothesis that large firms hold less cash due to economies of scale in security issuances.

Other results also support the precautionary motive in the literature. The negative relationship between leverage and cash holdings is also consistent with the pecking order theory and increased monitoring, but the positive coefficient on the squared leverage coefficient indicates that firms tend to hold more cash when the probability of financial distress increases. In contrast, we cannot detect a significant relationship between the market-to-book ratio and cash holdings. Based on the precautionary motive, one would expect a positive relationship because growth firms will avoid foregoing valuable investment opportunities due to cash shortages. Finally, we document a moderate positive relationship between dividend payments and cash holdings, probably reflecting firms' reluctance to cut dividend payments.

The influence of agency cost of managerial discretion on corporate cash holdings could also be subsumed under the precautionary motive. While most of our corporate governance variables do not have a significant impact on the cash ratio, our results indicate that managerial shareholdings affect cash holdings in two ways. First, a higher percentage of managerial ownership reduces a firm's cash ratio. Second, however, the cash ratio increases when the absolute value of managerial shareholdings in a firm increases. The two opposing effects can be interpreted as an alignment effect and a risk aversion effect, respectively. Furthermore, a firm's cash ratio is much higher if the CEO simultaneously serves as the COB, suggesting increased problems from an agency perspective under CEO duality.

Finally, we analyse the speed of adjustment of Swiss firms towards an endogenous target cash ratio. The estimated adjustment coefficient from dynamic panel models varies between 0.35 and 0.5, indicating that Swiss firms adjust slower towards their target cash ratio than firms in other countries. We suspect that the most reasonable explanations are based on the strong influence of banks in Switzerland and/or the unfavourable economic conditions during our sample period that entail low costs of deviation from the target.

ENDNOTES

[1] In what follows, the expressions cash, cash holdings, cash reserves and liquidity are synonymously used for cash and equivalents.
[2] Banks are an exception, because the "Swiss Banking Regulation" *requires* a separation of the two functions.
[3] BASKIN (1987) looks at cash holdings from a game theoretical point of view. He presents evidence for the hypothesis that cash reserves can be used to signal a firm's commitment to retaliate against market encroachment.
[4] See Credit Suisse Economic Briefing 39 (2005), p. 26.
[5] DITTMAR et al. (2003) also employ this second definition of the cash ratio. With this measure, for example, the median Swiss firm's cash ratio is twice as high as that of UK
[6] We use ALTMAN'S (1968) estimated coefficients, which are computed using a sample of US firms.
[7] Due to data limitations, we compute CASHCC without accruals and taxes.
[8] This notion also implies that the marginal value of cash to shareholders should increase as leverage decreases (e.g., FAULKENDER and WANG, 2005)
[9] The coefficients of our alternative dividend variables (*POR* and *DIVYIELD*) are estimated insignificantly.
[10] For a discussion in the context of optimal capital structure see Myers (1984) and Fischer et al. (1989).
[11] Similar dynamic adjustment models have been used in the capital structure literature, e.g., DE MIGUEL and PINDADO (2001) and DROBETZ and FIX (2005).
[12] Note that firms adjust towards a time-varying target. In fact, a firm could passively adjust towards the target cash ratio if it does not change its cash holdings, but rather the target cash ratio changes towards the actual cash ratio. For a model with a time-varying adjustment speed see DROBETZ and WANZENRIED (2005).
[13] See also OZKAN and OZKAN (2004) and COUDERC (2005).
[14] All corporate governance variables are measured as of year-end 2003. For a small number of firms that did not disclose the necessary information in 2003, the values of 2004 are used instead.

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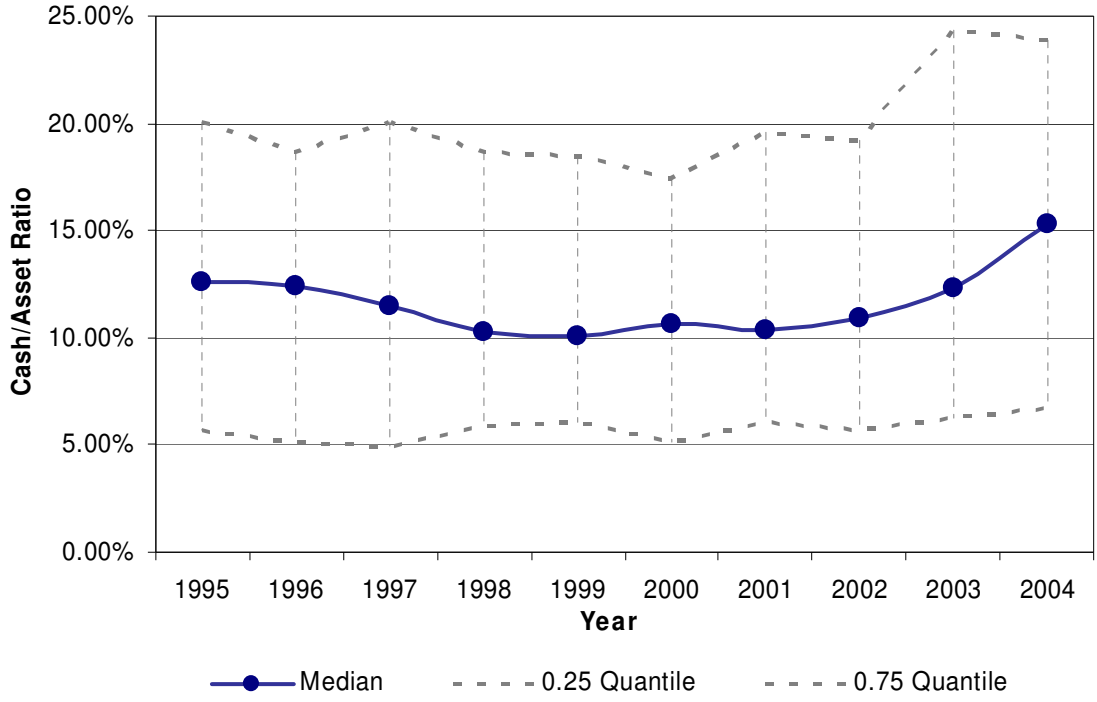
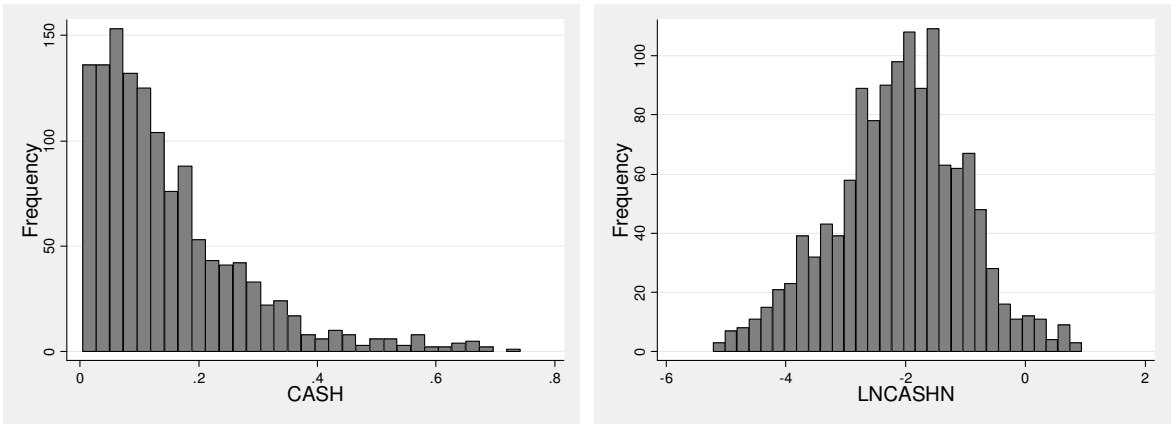
Figure 1: Median cash/asset ratio of Swiss firms 1995-2004



The cash/asset ratio is calculated by dividing cash and equivalents by book value of total assets. The graphs exhibit the median and the 0.25 as well as the 0.75 quantile of the cash ratio of non-financial Swiss firms from 1995-2004. The number of observation varies for the different years and range from 88 to 156.

Figure 2: Histogram of CASH and LNCASHN of Swiss firms 1995-2004



Jarque-Bera test statistic: 2559***

Without outliers:
Jarque-Bera test statistic: 1082***

Jarque-Bera test statistic: 79.09***

Jarque-Bera test statistic: 4.027

CASH is defined as the ratio of cash and equivalents divided by total assets. LNCASH is defined as the natural logarithm of cash and equivalents divided by net assets.

Table 1: Descriptive statistics

variable	mean	max	0.75 quantile	median	0.25 quantile	min	std. dev.	N
CASH	0.1480	0.7195	0.1962	0.1140	0.0587	0.0038	0.1259	1299
CASHN	0.2126	2.5657	0.2440	0.1286	0.0623	0.0039	0.2798	1299
SIZE	2710	123851	964	299	100	12	11680	1283
LSIZE1	12.7598	18.6346	13.7791	12.6072	11.5089	9.3780	1.7783	1283
LSIZE2	165.9716	347.2478	189.8642	158.9406	132.4550	87.9477	47.6270	1283
LEV	0.2511	0.6850	0.3544	0.2417	0.1296	0.0001	0.1505	1271
DIVDUM	0.7462	1.0000	1.0000	1.0000	0.0000	0.0000	0.4354	1312
POR	0.4026	2.8750	0.4581	0.3308	0.2344	0.0143	0.3262	911
DIVYIELD	0.0232	0.0831	0.0315	0.0218	0.0143	0.0007	0.0124	935
PROFIT	0.0511	0.2713	0.0867	0.0511	0.0217	-0.3204	0.0723	1309
MTBR	2.2465	13.6703	2.6933	1.4953	0.9829	0.3840	2.0798	1239
RD	0.0229	0.2888	0.0344	0.0000	0.0000	0.0000	0.0419	1340
RDDUM	0.4232	1.0000	1.0000	0.0000	0.0000	0.0000	0.4942	1354
1/ZSCORE	0.3360	1.5099	0.4501	0.2931	0.1577	0.0013	0.2455	1152
TANGF	0.3643	0.9426	0.4844	0.3381	0.2001	0.0317	0.2071	1297
TANGR	0.1942	0.4703	0.2594	0.1889	0.1172	0.0088	0.1023	1291
TANGI	0.1694	0.4593	0.2379	0.1721	0.0868	0.0031	0.1029	1288
CASHCC	135	605	171	124	73	-1	89	1156

The table shows a data description of 156 SPI non-financial firms over the period from 1995 to 2004. All variables are explained in the text and are truncated at the 1% and 99% levels.

Table 2: Correlation matrix

	CASH	LNCASHN	LSIZE1	LEV	POR	DIVYIELD	PROFIT	MTBV	RD	1/ZSCORE	TANGF	TANGR	TANGI	CA.CC
CASH	1.00													
LNCASHN	0.92	1.00												
LSIZE1	0.17	0.21	1.00											
LEV	-0.47	-0.51	-0.10	1.00										
POR	-0.06	-0.07	-0.02	0.07	1.00									
DIVYIELD	-0.04	-0.06	-0.35	0.04	0.35	1.00								
PROFIT	0.07	0.11	0.18	-0.16	-0.10	-0.09	1.00							
MTBR	0.13	0.15	0.41	-0.04	-0.03	-0.44	0.52	1.00						
RD	0.20	0.18	0.30	-0.07	-0.06	-0.34	0.12	0.37	1.00					
1/ZSCORE	-0.36	-0.40	-0.27	0.74	0.16	0.28	-0.41	-0.46	-0.21	1.00				
TANGF	-0.41	-0.43	-0.31	0.27	0.11	0.20	-0.26	-0.31	-0.26	0.39	1.00			
TANGR	-0.06	0.00	-0.02	-0.14	-0.09	-0.07	0.23	0.23	0.07	-0.29	-0.58	1.00		
TANGI	-0.28	-0.22	-0.14	0.08	-0.14	-0.05	0.11	-0.02	0.10	-0.01	-0.37	0.36	1.00	
CASHCC	-0.03	-0.04	0.37	0.01	-0.06	-0.30	0.08	0.19	0.58	-0.07	-0.29	-0.01	0.44	1.00

This table presents Pearson's correlation coefficients calculated with the values of the whole sample over the 1995-2004 period. The variables are explained in section 3.1. All variables are truncated at the 1% and 99% levels.

Table 3: Cross-sectional time-series regression results

Variable	(1)		(2)		(3)		(4)	
	fixed ef.	rand. ef.	fixed ef.	rand. ef.	fixed ef.	rand. ef.	fixed ef.	rand. ef.
Dependent:	CASH	CASH	CASH	CASH	CASH	CASH	CASH	CASH
LSIZE1	-0.031***	-0.017***	-0.009	0.004				
	(-5.70)	(-5.08)	(-1.45)	(1.05)				
LSIZE2					-0.025**	-0.006	-0.026**	-0.006
					(-2.05)	(-1.47)	(-2.15)	(-1.38)
LEV	-0.148	-0.201**	-0.440***	-0.503***	-0.429***	-0.529***	-0.426***	-0.522***
	(-1.58)	(-2.41)	(-5.30)	(-6.46)	(-4.34)	(-6.20)	(-4.14)	(-5.90)
LEV^2	-0.001	0.042	0.502***	0.560***	0.491**	0.578***	0.488**	0.568***
	(-0.01)	(0.32)	(3.77)	(4.66)	(3.09)	(4.37)	(3.05)	(4.18)
TANGR	-0.569***	-0.549***						
	(-7.01)	(-9.19)						
TANGI	-0.597***	-0.575***						
	(-8.66)	(-10.63)						
TANGF	-0.569***	-0.547***	-0.370***	-0.309***	-0.409***	-0.270***	-0.409***	-0.274***
	(-12.77)	(-14.5)	(-7.59)	(-10.31)	(-7.67)	(-8.66)	(-7.60)	(-8.67)
RDDUM	-0.007	-0.007	0.001	-0.001				
	(-0.77)	(-0.91)	(0.13)	(-0.16)				
RD					0.181	0.295*	0.126	0.252
					(0.80)	(1.88)	(0.55)	(1.60)
PROFIT	0.074	-0.032	-0.061	-0.158*	-0.031	-0.065	-0.026	-0.054
	(1.20)	(-0.55)	(-0.83)	(-1.90)	(-0.27)	(-0.64)	(-0.23)	(-0.53)
DIVDUM	0.013*	0.013*	0.021**	0.020**				
	(1.85)	(1.90)	(2.66)	(2.68)				
POR							0.000	0.002
							(0.03)	(0.16)
DIVYIELD					0.402	0.463		
					(1.05)	(1.27)		
1/ZSCORE	-0.052*	-0.034						
	(-1.94)	(-1.43)						
MTBR	0.004	0.003	-0.003	-0.001	-0.001	0.001	-0.002	0.000
	(1.47)	(1.3)	(-1.07)	(-0.56)	(-0.37)	(0.50)	(-0.81)	(-0.09)
CASHCC	0.048	0.033	-0.269***	-0.238***				
	(0.51)	(0.46)	(-4.08)	(-4.05)				
Constant	1.024***	0.848***	0.512***	0.343***	0.712***	0.413***	0.735***	0.421***
	(12.42)	(13.88)	(6.50)	(7.10)	(4.44)	(6.19)	(4.64)	(6.31)
R^2 within	0.470	0.464	0.254	0.242	0.241	0.223	0.235	0.218
R^2 between	0.563	0.633	0.266	0.371	0.255	0.363	0.233	0.342
R^2 overall	0.538	0.587	0.248	0.317	0.224	0.315	0.214	0.306
Observ.	919	919	992	992	852	852	847	847
Groups	144	144	147	147	135	135	134	134
Hausman		201.98***		-57.85		30.95**		-36.90

This table presents panel data regressions with fixed and random effects. All variables are truncated at the 1% and 99% levels. CASH is the dependent variable; it is calculated by dividing cash and equivalents by total assets. All explanatory variables are explained in the text. The last row shows the value of a Hausman (1978) statistic. For the fixed effects estimation, the t-statistic and for the random effects estimation the z-statistics are shown in parentheses. Year dummies are included in all specifications. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively. The coefficient of CASHCC is multiplied by a factor 1'000.

Table 4: Cross-sectional time-series regression results with LNCASHN

Variable	(1)		(2)		(3)		(4)	
	fixed ef.	rand. ef.	fixed ef.	rand. ef.	fixed ef.	rand. ef.	fixed ef.	rand. ef.
Dependent:	LNCASHN	LNCASHN	LNCASHN	LNCASHN	LNCASHN	LNCASHN	LNCASHN	LNCASHN
LSIZE1	-0.309***	-0.104***	-0.145**	0.043				
	(-6.41)	(-3.95)	(-2.93)	(1.41)				
LSIZE2					-0.276**	-0.028	-0.286**	-0.033
					(-2.87)	(-0.76)	(-3.05)	(-0.87)
LEV	-0.410	-0.939	-2.616***	-3.042***	-2.469***	-3.264***	-2.410**	-3.217***
	(-0.60)	(-1.59)	(-4.40)	(-5.39)	(-3.45)	(-5.09)	(-3.30)	(-4.91)
LEV^2	-1.095	-1.027	2.508**	2.774**	2.609**	2.808**	2.495**	2.789**
	(-0.93)	(-0.96)	(2.39)	(2.82)	(2.11)	(2.53)	(2.01)	(2.46)
TANGR	-4.206***	-3.937***						
	(-7.26)	(-9.01)						
TANGI	-3.815***	-3.816***						
	(-7.27)	(-9.01)						
TANGF	-4.397***	-4.333***	-2.863***	-2.668***	-3.256***	-2.437***	-3.291***	-2.478***
	(-15.22)	(-19.03)	(-7.95)	(-11.47)	(-7.92)	(-8.95)	(-7.93)	(-9.00)
RDDUM	-0.162*	-0.119	-0.121	-0.091				
	(-1.76)	(-1.59)	(-1.35)	(-1.20)				
RD					0.570	1.551	0.231	1.239
					(0.34)	(1.38)	(0.14)	(1.10)
PROFIT	0.952*	0.076	-0.056	-0.816	0.214	-0.003	0.022	-0.103
	(1.79)	(0.18)	(-0.09)	(-1.45)	(0.24)	(0.00)	(0.03)	(-0.14)
DIVDUM	0.034	0.015	0.107*	0.083				
	(0.57)	(0.27)	(1.70)	(1.31)				
POR							-0.081	-0.067
							(-0.88)	(-0.75)
DIVYIELD					2.095	2.62		
					(0.75)	(0.99)		
1/ZSCORE	-0.506**	-0.253						
	(-2.07)	(-1.22)						
MTBR	0.037*	0.022	-0.010	-0.013	-0.019	-0.001	-0.021	-0.006
	(1.94)	(1.36)	(-0.60)	(-0.76)	(-0.91)	(-0.05)	(-1.08)	(-0.38)
CASHCC	0.174	0.373	-2.581***	-2.295***				
	(-0.22)	(-0.59)	(-4.81)	(-4.40)				
Constant	5.466***	2.905***	1.704**	-0.640	3.291**	-0.220	3.504**	-0.058
	(8.04)	(7.41)	(2.63)	(-1.61)	(2.60)	(-0.39)	(2.86)	(-0.10)
R^2 within	0.387	0.369	0.224	0.203	0.208	0.187	0.211	0.191
R^2 between	0.427	0.647	0.229	0.469	0.197	0.399	0.179	0.368
R^2 overall	0.392	0.557	0.203	0.363	0.173	0.324	0.17	0.319
Observ.	916	916	989	989	851	851	846	846
Groups	143	143	146	146	135	135	134	134
Hausman		91.25***		-203.24		27.75**		-47.34

This table presents panel data regressions with fixed and random effects. All variables are truncated at the 1% and 99% levels. LNCASHN is the dependent variable, it is computed as the natural logarithm of the ratio of cash & equivalents and net assets (i.e., total assets minus cash). All explanatory variables are explained in the text. The last row shows the value of a Hausman (1978) statistic. For the fixed effects estimation the t-statistic and for the random effects estimation the z-statistics are shown in parentheses. Year dummies are included in all specifications. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively. The coefficient of CASHCC is multiplied by a factor 1'000.

Table 5: Dynamic panel data estimation results without outliers

Variable	(1)	(2)	(3)	(4)
Dependent:	CASH	CASH	LNCASHN	LNCASHN
CASH(t-1)	0.624***	0.641***	0.502***	0.515***
	(8.12)	(8.00)	(4.68)	(4.68)
LSIZE2	-0.001	-0.001	0.008	0.008
	(-0.42)	(-0.57)	(0.29)	(0.27)
LEV	-0.298**	-0.301**	-2.683**	-2.717**
	(-2.58)	(-2.42)	(-2.44)	(-2.55)
LEV^2	0.321**	0.340*	1.829	2.081
	(2.01)	(1.96)	(1.05)	(1.23)
TANGF	-0.064**	-0.060**	-0.920**	-0.855**
	(-2.94)	(-2.72)	(-2.76)	(-2.60)
RD	0.163*	0.109	0.953	0.656
	(1.76)	(1.09)	(1.06)	(0.76)
PROFIT	-0.179**	-0.136*	-1.154	-0.855
	(-2.12)	(-1.71)	(-1.55)	(-1.21)
POR		-0.004		-0.046
		(-0.37)		(-0.46)
DIVYIELD	0.529		5.273*	
	(1.33)		(1.86)	
MTBR	0.003	0.002	0.030	0.016
	(1.42)	(0.80)	(1.60)	(0.94)
Constant	0.134**	0.134**	-0.256	-0.468
	(2.82)	(3.07)	(-0.55)	(-1.02)
Correl. 2	-0.811	-0.811	-0.946	-0.594
Hansen test	41.314	43.922	41.470	41.557
Observ.	766	761	764	759
Groups	132	131	132	130

This table presents the estimates of a two-step dynamic GMM estimation. All variables are truncated at the 1% and 99% levels. CASH is calculated by dividing cash & equivalents by total assets. LNCASHN is the natural logarithm of the ratio of cash & equivalents and net assets (i.e., total assets minus cash). All explanatory variables are explained in the text. Correl. 2 is the Arellano-Bond (1991) test statistic for the null hypothesis that there is no second-order correlation in residuals. The Hansen (1982) test shows the statistic for the null hypothesis that all estimated orthogonality conditions are zero. The z-statistics are shown in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Table 6: Descriptive statistics

variable	mean	max	0.75 quantile	median	0.25 quantile	min	std. dev.
CASH	0.143	0.328	0.222	0.120	0.065	0.014	0.094
LNCASHN	-2.057	-0.717	-1.254	-1.988	-2.664	-4.283	0.921
LNSIZE	12.958	18.755	13.960	12.678	11.532	9.376	1.986
LEV	0.260	0.532	0.362	0.266	0.172	0.021	0.127
LEV_2	0.089	0.346	0.133	0.074	0.031	0.000	0.073
TANGF	0.357	0.917	0.449	0.340	0.200	0.066	0.194
RD	0.025	0.235	0.034	0.002	0.000	0.000	0.042
DIVYIELD	0.019	0.089	0.028	0.017	0.008	0.000	0.015
MTBV	2.589	12.956	3.064	1.740	1.127	0.431	2.245
CFV	0.047	0.240	0.056	0.036	0.025	0.012	0.039
MOWNER	0.170	0.680	0.342	0.053	0.004	0.000	0.208
CEOCOB	0.178	1.000	0.000	0.000	0.000	0.000	0.384
LSHARE	6.766	14.000	8.000	7.000	5.000	3.000	2.139
BLOCK	0.210	0.920	0.334	0.140	0.000	0.000	0.235
SCAT	0.271	1.000	1.000	0.000	0.000	0.000	0.447
BSIZE	6.766	14.000	8.000	7.000	5.000	3.000	2.139

The table shows the data of 107 SPI non-financial firms over the period from 1999 to 2003. MOWNER is the percentage of shares (capital) hold by insiders. CEOCOB is a dummy variable which takes on the value of one if the CEO and the COB is the same person, and zero else. LSHARE denotes the percentage voting rights of the largest shareholder. BLOCK is the percentage of total voting rights of shareholders (that are not in the management, on the board, or related to such insiders) with more then 5% voting rights. SCAT takes on the value of 1 if a company has more than one share category, and zero else. BSIZE is the number of representatives on the board. All variables are observed as of year-end 2003. The other firm-specific variables are taken as four year averages from 1999 to 2002 and are explained in the text. The cash ratio is observed as of year-end 2003 and is truncated at the 5% and 95% levels.

Table 7: Cross-sectional regression results

Variable						
Dependent	LNCASHN	LNCASHN	LNCASHN	LNCASHN	LNCASHN	LNCASHN
LNSIZE	0.038	0.036	0.035	0.065	0.063	0.061
	(0.65)	(0.60)	(0.59)	(0.85)	(0.80)	(0.75)
LEV	-3.290	-3.207	-3.182	-2.996	-2.953	-2.934
	(-1.59)	(-1.50)	(-1.48)	(-1.33)	(-1.29)	(-1.28)
LEV_2	2.806	2.678	2.648	2.659	2.596	2.578
	(0.78)	(0.73)	(0.72)	(0.68)	(0.65)	(0.65)
RD	-0.933	-0.891	-0.896	-1.082	-1.063	-1.076
	(-0.4)	(-0.38)	(-0.39)	(-0.44)	(-0.44)	(-0.44)
DIVYIELD	0.878	1.067	0.997	3.208	3.289	3.065
	(0.15)	(0.18)	(0.17)	(0.48)	(0.49)	(0.46)
TANGF	-0.866	-0.87	-0.873	-0.746	-0.749	-0.745
	(-1.37)	(-1.36)	(-1.37)	(-1.25)	(-1.25)	(-1.23)
MTBV	0.047	0.049	0.049	0.041	0.042	0.042
	(1.24)	(1.21)	(1.20)	(1.03)	(1.02)	(1.01)
CFV	1.039	1.027	0.993	1.614	1.609	1.580
	(0.41)	(0.41)	(0.39)	(0.65)	(0.65)	(0.63)
MOWNER	-5.084**	-5.371*	-5.956	-5.377**	-5.550*	-6.302
	(-2.23)	(-1.95)	(-1.62)	(-2.10)	(-1.76)	(-1.56)
MOWNER^2		0.509	3.118		0.286	3.458
		(0.22)	(0.26)		(0.12)	(0.31)
MOWNER^3			-2.884			-3.472
			(-0.23)			(-0.29)
MOWNER*LNSIZE	0.363**	0.363**	0.366**	0.398**	0.399**	0.404**
	(2.18)	(2.19)	(2.18)	(2.12)	(2.09)	(2.10)
CEOCOB				0.364*	0.364*	0.370*
				(1.80)	(1.80)	(1.87)
BSIZE				-0.056	-0.055	-0.054
				(-0.99)	(-0.98)	(-0.96)
LSHARE				-0.188	-0.197	-0.196
				(-0.32)	(-0.34)	(-0.33)
BLOCK				0.192	0.187	0.158
				(0.32)	(0.30)	(0.26)
SCAT				0.062	0.065	0.066
				(0.23)	(0.24)	(0.24)
Constant	-1.455	-1.448	-1.439	-1.527	-1.508	-1.462
	(-1.38)	(-1.37)	(-1.35)	(-1.15)	(-1.11)	(-1.05)
R^2	0.432	0.433	0.433	0.458	0.458	0.458
R^2 (adj.)	0.324	0.317	0.309	0.316	0.308	0.300
Jarque-Bera	5.139*					

This table presents cross-sectional regression results for 107 firms. LNCASHN is truncated at the 5% and 95% levels. The governance variables are described in table 6. Robust t-values are shown in parentheses. Dummies for industry classification are included in the estimation, but the estimated coefficients as omitted in the table. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.