

What Drives Corporate Liquidity? An International Survey of Cash Holdings and Lines of Credit

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This draft: August 2009

Abstract

We survey CFOs of public and private firms in 29 countries about aspects of corporate liquidity that cannot be obtained from publicly available data. Lines of credit are very important liquidity instruments relative to cash holdings. The median line of credit is equal to 15 percent of book assets whereas cash holdings comprise only 9 percent of book assets. Of these cash holdings, the fraction held as non-operational cash (rather than held for day-to-day operations) is only about 40% of the total. Cash provides unconditional liquidity, and lines of credit provide conditional liquidity. Without any market imperfections, these should be perfect substitutes. We find evidence that where lines of credit are more assured, managers do view these two as substitutes. Generally, however, cash and lines of credit are held for different purposes. Lines of credit are strongly related to a firm's need for external financing to fund future investment opportunities. Non-operational cash is primarily held as a general buffer against future cash shortfalls. Across countries, firms make greater use of lines of credit when external credit markets are poorly developed.

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Abstract

We survey CFOs of public and private firms in 29 countries about aspects of corporate liquidity that cannot be obtained from publicly available data. Lines of credit are very important liquidity instruments relative to cash holdings. The median line of credit is equal to 15 percent of book assets whereas cash holdings comprise only 9 percent of book assets. Of these cash holdings, the fraction held as non-operational cash (rather than held for day-to-day operations) is only about 40% of the total. Cash provides unconditional liquidity, and lines of credit provide conditional liquidity. Without any market imperfections, these should be perfect substitutes. We find evidence that where lines of credit are more assured, managers do view these two as substitutes. Generally, however, cash and lines of credit are held for different purposes. Lines of credit are strongly related to a firm's need for external financing to fund future investment opportunities. Non-operational cash is primarily held as a general buffer against future cash shortfalls. Across countries, firms make greater use of lines of credit when external credit markets are poorly developed.

1. Introduction

Academic researchers have relied upon readily available financial statement data to study corporate cash holdings as a proxy for corporate liquidity. This work suggests that firms' cash levels are high and, in the U.S, increasing over time (Bates, Kahle, and Stulz (2009)), a point echoed in the financial press.¹ Cash levels are not the only source of liquidity, however. As illustrated in recent papers by Sufi (2009) and Yun (2009) using U.S. data, there is substantial reliance on lines of credit as a source of liquidity relative to cash. Moreover, high cash levels do not necessarily imply that firms have substantial amounts of excess cash, because some cash may be used in the normal course of business.

In this paper, we examine a number of theoretical predictions regarding the choice between cash reserves and lines of credit as sources of corporate liquidity, including the extent to which they are viewed as substitutes by financial managers. While cash and lines of credit can both provide liquidity, they are not identical in real world situations. As the recent credit crisis reminds us, cash provides unconditional liquidity, whereas lines of credit are available only as long as the would-be borrower continues to meet covenants and the lender remains solvent. We examine the size, determinants, and substitutability of corporate liquidity by conducting a comprehensive survey of Chief Financial Officers (CFOs), along the lines of Graham and Harvey (2001), Brav, Graham, Harvey, and Michaely (2005), and Graham, Harvey, and Rajgopal (2005), for a broad range of both public and private firms from 29 countries.

We explore four facets of corporate liquidity that are difficult to assess using traditional financial statement data. First, we ask corporate executives to identify the fraction of their cash and marketable securities that is held as excess cash, defined in our survey as "cash and marketable securities above that used in the normal course of business, held as compensating balances for your

¹ For instance, a Wall Street Journal article notes that many well-known companies in the S&P Industrials index carry cash and marketable securities that exceed 25% of their total market value [McDonald (2006)].

banks or held as trapped cash.” Since excess cash (which we also refer to as non-operational cash) is not held to fund normal business operations, it can be employed for strategic purposes.

Second, we ask executives to identify the magnitude of their lines of credit. Unlike in the U.S., data on lines of credit are not publicly available in many countries because of varying disclosure requirements. The survey therefore provides us with unique data to assess the importance of credit lines globally.

Third, we specifically ask corporate executives whether they view cash holdings and lines of credit as substitute liquidity instruments, and what factors they consider important when choosing their level of non-operational cash and their line of credit.

Fourth, we use regressions to examine whether firm attributes are related to the level of liquidity and the choice between the two sources of liquidity. For instance, we are able to study whether more profitable firms are more likely to view non-operational cash and lines of credit as substitute liquidity instruments. Similarly, we are able to study whether firms’ views on future capital needs and misvaluation in equity and credit markets affect their corporate liquidity choices. We also examine whether liquidity choices depend on a country’s credit market development.

Our work provides new evidence about corporate liquidity in an international context. Several contributions stand out, in particular. First, lines of credit are the dominant component of corporate liquidity in our global sample of firms, with a median line of credit equal to 15 percent of book assets. This percentage is similar to the 16% line of credit to book assets ratio that Sufi (2009) reports for a sample of U.S. firms. Thus, it appears that a substantial reliance on credit lines for liquidity is not just a U.S. phenomenon.

Second, much of the cash held by firms is to fund operations and thus is not “effective liquidity” that can be tapped at will. Overall, total cash holdings amount to 9 percent of book assets, but cash held for non-operational purposes comprises only 40% of total cash holdings. As such, non-operational cash holdings are only a small fraction of book assets. These results indicate that high levels of total cash (as are often observed for U.S. firms) do not necessarily correspond to high levels

of non-operational, or excess, cash. Thus, conclusions often drawn by practitioners and academics that firms are holding too much cash may have been premature.

Third, while both cash and lines of credit provide liquidity, we reject the null hypothesis that managers view them as perfect substitutes. Fewer than half of the CFOs surveyed believe these to be substitute liquidity instruments, and the degree to which they are seen as substitutes reflects several theoretically motivated factors. Executives are more likely to judge lines of credit as a substitute for excess cash if their firm is more profitable, and the line of credit is thus more assured, if their firm has fewer potential agency problems, and if their firm is domiciled in a country where credit is more readily available.

Fourth, to the extent they are not seen as substitutes, cash and lines of credit appear to be held for different purposes. Researchers often cite a precautionary motive for holding cash so that if future growth opportunities arise, they can be funded even if external capital is difficult to obtain. We find this argument to be valid for lines of credit, but not for non-operational cash holdings. Firms that indicate a strong need to obtain future external funds and firms that perceive their equity to be undervalued have larger credit lines, but do not have larger levels of non-operational cash.

Fifth, our evidence indicates that non-operational cash serves a basic precautionary function – to provide a general purpose buffer against future cash shortfalls. CFOs state that this is the primary driver of non-operational cash holdings – with its importance ranking far exceeding the rankings of other response choices. Thus, it appears that firms use non-operational cash to insure against all types of negative shocks to cash flows. This finding positions excess cash holdings as a form of financial distress (or bankruptcy) insurance.

Sixth, we provide new evidence on the determinants of corporate liquidity at the country level. Prior research on total cash holdings does not support the precautionary motive for liquidity at the country level because it finds that firms hold less, rather than more, total cash when private credit markets are poorly developed. When we investigate this relation for lines of credit – a more substantive measure of corporate liquidity – we find that firms do have larger lines of credit when

credit markets are less developed, which supports the precautionary motive for liquidity at the country level.

Finally, our survey data allow us to assess whether regression models of the determinants of total cash holdings yield different insights when estimated using non-operational cash holdings instead. While we find that much of firms' total cash holdings are employed for operational purposes, we also find that the correlation between total cash and non-operational cash is relatively high ($\rho=0.75$, $p\text{-value}=0.00$). In addition, the coefficient estimates from our regression models are generally similar whether we employ total cash or non-operational cash as the dependent variable. (The one exception is that profitability is positively related to total cash holdings, but not to non-operational cash holdings.) Employing total cash as a proxy for non-operational cash in a regression framework, as is common in the literature, is therefore reasonable.

The remainder of this paper is organized as follows. In the next section, we review the literature on corporate liquidity. In Section 3, we discuss how our survey allows us to address a number of unanswered questions, and we describe the survey design and respondent firm characteristics. In Section 4, we discuss the liquidity survey results. Section 5 presents regression models that assess the magnitude of non-operational cash and lines of credit as well as the factors that lead firms to consider them as substitutes. Section 6 discusses limitations of the survey and the inferences that can be drawn from the analysis. Section 7 provides concluding remarks. An appendix detailing the construction of the interval regressions used in our analysis follows the conclusion.

2. Determinants of Corporate Liquidity and the Choice between Cash Holdings and Lines of Credit

In this section, we summarize the theoretical work on the determinants of corporate liquidity and the choice between cash holdings and lines of credit. We begin with the null hypothesis that these liquidity choices are perfect substitutes. Such an outcome obtains under perfect capital market assumptions because the amount of liquidity, whether held in cash or as a line of credit, has no impact

on the firm's value (except for the value of the cash itself); thus, the choice between the two does not matter either. Under these assumptions, firms without cash can raise it at will at zero deadweight costs. When various imperfections are introduced, however, the amount of liquidity can indeed matter as can the choice of liquidity.

2.1. Factors affecting cash holdings and lines of credit similarly

A long line of research demonstrates that corporate liquidity has benefits that arise from a reduction of the likelihood of costly outcomes. This work is framed primarily around the benefits of holding cash, but the intuition generally carries over to credit lines as well. Two benefits have received the most attention. First, firms do not have to incur transaction costs to frequently raise funds [see Keynes (1936), Miller and Orr (1966), and Meltzer (1993)]. Second, information asymmetry between managers and capital market participants makes liquidity valuable because firms will not have to access capital markets to raise funds for capital expenditures when the cost of external capital is high, for example when their equity happens to be undervalued [see Myers and Majluf (1984), Almeida, Campello, and Weisbach (2004), and Acharya, Almeida, and Campello (2007)]. This is referred to in the literature as the precautionary motive for liquidity. Obviously, holding everything else constant, consistently profitable firms need less precautionary liquidity.

Gamba and Triantis (2008) further explore the role of liquidity. They argue that liquidity provides the firm with financial flexibility and find that the value of this flexibility can be quite large when there is significant growth potential on the upside or potentially poor performance on the downside. Transactions costs on debt issues and other frictions explain the simultaneous existence of cash holdings and debt finance in their model [see also Acharya, Almeida, and Campello (2007), who propose a hedging explanation for why firms would rather save cash than retire debt, and Riddick and Whited (2009) whose model implies higher cash holdings for firms with a higher cost of external finance and greater income uncertainty].

Corporate liquidity can confer strategic benefits as well. Maksimovic (1990) shows that having a credit line lowers expansion costs, which allows a firm to increase the severity of its threats against its industry rivals, thus improving the firm's position within its industry. The same logic applies to holding excess cash. These competitive considerations suggest that rivals' liquidity may be a relevant factor in shaping a firm's liquidity choices.

Both sources of liquidity have direct costs associated with them as well. For holding cash, the direct costs include the cost-of-carry (i.e., cash earns less than the cost of debt used to fund it, while in perfect capital markets, both interest costs would be equal) and the tax expense on the interest income [Gamba and Triantis (2008) and Riddick and Whited (2009)]. For lines of credit, banks typically charge firms commitment fees (up-front and/or on an annual basis) [Shockley and Thakor (1997)].

2.2. *Factors affecting cash holdings and lines of credit differently*

If lines of credit could be accessed under all circumstances, they would offer benefits comparable to cash. In reality, the key difference between cash holdings and lines of credit is the conditional nature of the line of credit. Cash represents unconditional liquidity that is available in both good and bad times. Lines of credit represent optional or conditional liquidity, where the option to obtain cash can be exercised only when a firm is doing well enough to satisfy covenant restrictions [Sufi (2009)] and when the lender is still able to honor its promise to provide cash. In other words, the option can only be exercised during good times for the firm (and its lender(s)).²

Consistent with this reasoning, two key findings of Sufi (2009) are that firms cannot obtain or use lines of credit unless they are sufficiently profitable and that less profitable firms are more likely to violate covenants associated with credit lines. Thus, firms with low profitability are less likely to consider lines of credit and non-operational cash holdings as substitute liquidity instruments.

² Recent papers show how financial managers in the credit crisis preemptively drew down lines of credit of still-solvent banks [(Ivashina and Scharfstein (2009))] and how weaker borrowers draw down their lines of credit while they still can [Jimenez, Lopez, and Saurina (2010)].

Additionally, recent failures of financial institutions serve as reminders that a bank's promise to provide credit can be extinguished overnight if it fails.

Another difference between cash and lines of credit is that management and/or controlling shareholders may hoard cash so that they can use it for their own private benefits rather than for the benefit of minority shareholders [see Easterbrook (1984), Jensen (1986), Blanchard, Lopez-de-Silanes, and Shleifer (1994), Harford (1999), Opler, Pinkowitz, Stulz, and Williamson (1999), Dittmar, Mahrt-Smith, and Servaes (2003), Mikkelsen and Partch (2003), Pinkowitz, Stulz, and Williamson (2006), Dittmar and Mahrt-Smith (2007), Kalcheva and Lins (2007), and Harford, Mansi, and Maxwell (2008)]. As both Yun (2009) and Sufi (2009) argue, this agency problem is mitigated if liquidity is in the form of a credit line because a bank monitors the firm and imposes a number of restrictive covenants, which may make it difficult to obtain the funding when actually needed [see also Lopez et al. (2010)]. A key finding of Yun (2009) is that firms with greater expected agency problems are less likely to view cash and credit lines as equivalent liquidity instruments. In particular, Yun reports that firms increase cash holdings relative to lines of credit when state antitakeover laws reduce future control threats.

Agency problems are also considered in earlier research on credit lines, but this work treats credit lines as committed rather than conditional, and compares them to the alternative of obtaining bank financing on the spot market, rather than to direct cash holdings. For example, in Boot, Thakor, and Udell (1987), firms employ lines of credit to protect themselves from the distortionary effects of possible increases in interest rates in the future on investment, while in Holmstrom and Tirole (1998), firms cannot obtain sufficient future external financing because of agency problems, which leads them to employ a bank line of credit instead.

Firms that pay dividends may be less likely to see cash holdings and lines of credit as substitutes. While much of the literature considers dividend payers to be less financially constrained, debt contracts often contain covenants limiting dividend payments unless certain conditions are met [see Smith and Warner (1979) and Nini, Smith, and Sufi (2009)]. Thus, if firms wish to maintain a

consistent dividend policy across economic cycles, they are more likely to prefer non-operational cash holdings over lines of credit as a source of liquidity.

We do not expect leverage to affect lines of credit or whether firms view cash holdings and lines of credit as substitutes (holding profitability constant), but it may affect the level of cash holdings. As argued by Bates et al. (2009), payments to debtholders reduce the ability of firms to accumulate excess cash over time [Jensen (1986)], which implies a negative relation between non-operational cash holdings and leverage. However, the hedging argument put forth in Acharya, et al. (2007) and Gamba and Triantis (2008) predicts a positive relation between leverage and cash holdings.

2.3. *Country level differences*

Dittmar et al. (2003) and Kalcheva and Lins (2007) explore the relation between corporate cash holdings and credit market development based on the argument that the precautionary demand for liquidity should be larger when credit is more difficult to obtain. These papers show that, contrary to expectations, poorly developed external credit markets are not associated with higher cash levels. Instead, both papers report that firms hold more cash when access to private credit is better. This finding is not consistent with a precautionary demand argument but is instead consistent with an agency cost interpretation: firms hold more cash when they have the opportunity to do so.

The predictions for lines of credit are nuanced. While firms will demand higher liquidity in the form of lines of credit when credit markets are poorly developed, such lines may not be consistently supplied by banks. Therefore, cash and credit lines are less likely to be perfect substitutes when credit markets are poorly developed.

3. Motivation for Survey, Survey Design and Respondent Characteristics

3.1. *Benefits of our Survey Approach*

As mentioned in the introduction, using a survey to assess corporate liquidity in an international setting has many benefits. First, while levels of total cash are available internationally,

line of credit data are not disclosed consistently in financial statements. International Financial Reporting Standards (under which most large international companies choose to or are required to report) do not explicitly refer to the disclosure of data on lines of credit. While some companies report under local GAAP, we have not found any consistent public disclosure requirements of credit lines for the countries in our sample. Thus, the only way to examine whether the use of lines of credit is as prevalent internationally as it is in the U.S. is to ask companies.

Second, most of the explanations regarding how various imperfections, whether in the form of transaction costs, asymmetric information, or agency problems, induce managers to hold relatively high levels of cash are, fundamentally, about non-operational (i.e., strategic) cash holdings, not operational cash holdings. This distinction is not reported in financial statements. Our survey asks respondents to indicate what fraction of cash is required for day-to-day purposes. As such, we can assess how much non-operational cash firms have and what its determinants are. This also allows us to investigate whether total cash holdings, which are commonly used in the liquidity literature, are a good proxy for non-operational cash holdings.

Third, earlier work has had to infer whether and for which firms cash holdings and lines of credit are substitute liquidity instruments, and how firms decide on the magnitude of each source of liquidity. In our survey, we ask financial executives directly whether or not they consider these liquidity choices as substitutes, and what factors they consider to be important when determining non-operational cash holdings and credit lines. We can also probe whether executives' perceptions of their firms' risk, equity and debt misvaluation, and need for external funding affect liquidity choices.

Finally, by using a survey, we can include both listed and privately held firms, and can assess whether they make different liquidity choices.

3.2. Survey Design and Delivery

Our data come from a survey of Chief Financial Officers conducted in the summer of 2005 covering publicly traded and privately owned firms from all over the world. This survey was

conducted in collaboration with Deutsche Bank Securities, Inc. We designed and presented participants with an extensive survey instrument covering many interconnected facets of financial policy. Prior to launching the survey, we tested it with an initial group of global CFOs to verify that the interpretations we gave to the questions and responses corresponded to their interpretations. We then altered the survey to reflect feedback from the beta testing period.

The survey instrument contained questions organized in nine sections (Company Information, CFO Views, Capital Structure, Liability Management, Liquidity Management, General Risk Management, Interest Rate Risk Management, Foreign Exchange Risk Management and Commodity Risk Management). It was administered over the internet and made use of conditional branching (i.e., certain responses led to detailed additional questions, while others did not). The survey was completely anonymous. While CFOs received a request from the academic researchers, the Deutsche Bank relationship officers covering the companies were requested to encourage firms to complete the survey, but the bankers did not ever have access to individual firms' responses.

In total, the survey instrument was sent to approximately 4000 firms in 48 countries. These are all firms worldwide that had a coverage officer assigned to them by the investment banking division of Deutsche Bank. This sample comprises the largest companies in their respective countries and industries. It does not include smaller firms in the bank's home market, because those are covered by local branches. A large fraction of the targeted firms were not Deutsche Bank clients at the time.

We did not request that companies complete every section and every question of the survey. We received responses from 354 firms who answered parts of the survey, and 215 firms answered the questions regarding corporate liquidity. Of these, 204 firms answered enough questions regarding topics unrelated to liquidity to allow for our regression analyses. In terms of the response rate and overall number of respondents, our survey is similar to the U.S. and Canadian firm CFO survey conducted by Graham and Harvey (2001), who had a final sample of 392 respondents and a response rate of about 9%. It also similar to the 8% response rate obtained by Brav et al. (2005) and Graham et

al. (2005) for the portion of their survey of U.S. and Canadian firm CFOs that was conducted via email rather than in person at a conference gathering.

The survey asks two types of questions on financial policies. Benchmarking questions focus on the facts regarding the decisions firms make, whether or not these decisions are observable by others. For example, we ask respondents to indicate levels of cash, the fraction of this cash that is held for non-operational purposes, and levels of lines of credit. Second, we pose perceptual questions, asking respondents to indicate their agreement or disagreement with certain statements or to select items from a list to help explain why their firms take certain decisions. These responses allow us to link liquidity to a number of its potential determinants such as perceived risk, equity and debt misvaluation, and future need for external capital. In framing these factual and perceptual questions, we are guided by extant theoretical explanations of corporate liquidity policy, discussed previously, as well as several practical explanations that may apply.

3.3. Respondent characteristics

In Table 1, we report the 29 countries of domicile of the 204 firms that completed the liquidity part of the survey. The countries with the largest representation are Germany, the U.S., and Japan.³ For robustness, we repeat all of our tests omitting each of the countries in our sample, one at a time, and find that our results are not sensitive to the exclusion of any one country.

Table 2 reports summary statistics for several firm attributes that correspond to variables typically obtained from publicly available data. As we describe in more detail later, we use these variables in our regression models. Our sample firms have mean total revenues of \$7.2 billion with median revenues of \$1.6 billion. Thus, they are somewhat larger than the sample firms from the 1990s obtained from the Worldscope and Global Vantage databases analyzed by Dittmar et al. (2003), Pinkowitz et al. (2006) and Kalcheva and Lins (2007). Mean and median profitability levels, measured as net income divided by shareholder's equity, are 12% and 11%, respectively. This

³ Only 18 firms in our sample are from the U.S. because the response rate in the U.S. was particularly low.

compares to a mean of 9% and a median of 8% for all firms from our sample of countries listed on Global Vantage as of year-end 2004. Leverage, measured as total liabilities divided by total assets is 57%, on average, with a median of 58%. These values are very similar to the year-end 2004 values for firms on Global Vantage from countries in our sample (mean=55% and median=56%).

Table 2 also shows that 34% of our sample firms are not listed on a public stock exchange, and that 10% of sample firms have been listed on an exchange for less than 5 years. The CEO is also the Chairman of the Board in 48% of our firms. Finally, 73% of our firms have paid regular dividends in the past five years, a result consistent with that reported for Worldscope firms by La Porta, Lopez-de-Silanes, Shleifer, and Vishny (2000). Overall, our sample firms resemble the firms typically studied in academic international corporate finance research.

4. Survey Responses

Before analyzing data on how much liquidity firms have, its forms, and the reasons for its choices, it is useful to put this topic in some perspective, using unique data from our survey. We asked CFOs to rank each of nineteen different finance functions based on how much value it creates for their firm. Three of the four most valuable functions as cited by CFOs were activities related to corporate liquidity management: debt issuance and management, working capital management, and bank relationships. This evidence indicates that executives care deeply about the management of corporate liquidity and believe it is among the most valuable financial activities they manage. In the following subsections, we analyze the responses to specific questions regarding liquidity in detail.

4.1. The level of cash holdings

We first document how much cash companies hold. We provided respondents with several ranges of cash holdings from which to choose, expressed as a fraction of total assets: 0%-2%, 2.1%-4%, 4.1%-6%, and so on through 20% or greater. Column (i) of Table 3 lists these categories and column (ii) presents the fraction of firms that fall in each category. The largest subset of respondents

(20% of the companies) has cash to assets above 20%. However, the second most important subset (18% of all respondents) holds relatively little cash, between 0% and 2% of assets. The total cash held by the remaining survey respondents is relatively evenly distributed between these two extremes. The median level of cash to assets falls within the 8%-10% category, a level similar to the median cash to asset levels reported by Dittmar et al. (2003), Pinkowitz et al. (2006), and Kalcheva and Lins (2007).

Next, we ask companies what fraction of their total cash holdings are excess cash holdings, and what fraction are operational cash holdings. Operational cash holdings are defined as cash required for day-to-day transaction purposes, cash held as compensating balances, or cash trapped in a foreign jurisdiction.⁴ We provide companies with ranges of excess (non-operational) cash holdings as a percentage of total cash holdings: 0%, 1-10%, 11-20% and so on. By explicitly obtaining data on non-operational cash holdings we are able to more directly assess firms' strategic liquidity choices.

For each range of total cash holdings, column (iii) of Table 3 lists the median percentage of total cash which is considered non-operational. Two conclusions emerge from these summary statistics. First, most cash held by corporations is considered to be operational cash. For the sample as a whole, median non-operational cash holdings as a fraction of total cash falls in the 21%-30% category (not reported in the table). Even for companies with very large total cash levels, only a minority of such cash is considered to be non-operational (31%-40%). Second, there is substantial variation in the level of non-operational cash, depending on total cash holdings. Not surprisingly, firms with low levels of total cash also have low levels of non-operational cash. For firms with total cash to assets between 6% and 18%, the fraction of cash that is not held for operational purposes generally increases as total cash increases.

As an additional measure, we compute a firm's non-operational cash to assets ratio by multiplying the median of a firm's total cash range by the median percentage that is non-operational cash. For example, if a firm indicates that cash holdings are between 6.1% and 8% of assets and that

⁴ Foley, Hartzell, Titman, and Twite (2007) provide evidence that cash trapped in a foreign jurisdiction is an important determinant of overall cash balances for U.S. firms. We note that trapped cash is primarily a U.S. phenomenon due to specific features of the U.S. corporate tax code.

non-operational cash holdings are between 21% and 30% of cash holdings, we compute non-operational cash to assets as 1.75% (7% multiplied by 25%). This computation yields a median value of the ratio of non-operational cash to book assets of only 2%. While much prior research employs the level of observed cash to proxy for the level of excess cash, our data suggest there is a large discrepancy between the two. Our results show that much of the cash held by firms is not being held for strategic purposes, but to support the daily operations of the business.

4.2. *The size of credit lines*

We also ask companies about the size of their credit lines as a percentage of assets. As with cash holdings, firms select from two-percentage-point ranges, with a lower limit of 0%-2% and an upper limit of 20% or greater. In addition, firms can indicate that they do not have a credit line at all. Column (i) of Table 4 lists these categories and column (ii) presents the fraction of firms that fall in each category. By far the largest subset of respondents (39% of the companies) has credit lines greater than 20% of their assets. Such credit lines are several times larger than the annual investment budgets and free cash flow levels of most corporations.⁵ This suggests that credit lines are being held for strategic purposes, such as taking advantage of growth and/or acquisition opportunities that may arise (we assess this possibility using regressions in a subsequent section) or to guard against economic distress. [Sufi (2009), however, argues that credit lines would not provide committed liquidity insurance because firms in economic distress would likely be in violation of covenants]. The median firm's line of credit is in the 14.1%-16% category. For each range of credit lines listed in column (i) of Table 4, column (iii) lists the corresponding median non-operational cash to assets level. Column (iii) shows that firms with no line of credit have quite high non-operational cash levels, but no pattern emerges across the other ranges.

⁵ Kalcheva and Lins (2007) report average annual capital expenditures to assets of 6% and average free cash flow to assets of 7% for a sample of over 5000 companies from 31 countries.

Overall, when we consider both credit lines and the level of cash holdings, it is clear that lines of credit provide a substantial amount of corporate liquidity worldwide, greatly exceeding the funds available from non-operational cash.

4.3. Deciding on the level of non-operational cash

In this section, we investigate what criteria firms employ when they decide to hold more cash than is needed on a day-to-day basis. Our approach mimics that of Graham and Harvey's (2001) survey-based paper in which specific theoretically motivated response choices are provided for a question to allow a deeper investigation of corporate finance theories. In particular, we ask respondents the question: "In deciding how much excess cash to hold, how important are the following factors?" As response choices, we specify 22 factors based on the theoretical considerations discussed in Section 2 of the paper; we also include several practical considerations mentioned by CFOs and other industry practitioners during the development of the survey instrument. For ease of interpretation, we group these factors into four broad categories based on the primary theoretical motivation that most closely applies, or whether it is a practical factor. The categories are: precautionary motive, agency costs, direct costs, and practical considerations.

Firms were asked to rank these on a six-point scale from 0 to 5, where a zero indicates that the factor is not important, and a 5 indicates that the factor is very important. Panel A of Table 5 reports summary statistics for the factors we ask about in the survey. We list the fraction of firms ranking each factor as a 4 or a 5, indicating that the factor is relatively important, as well as the mean respondent score for each question and the number of firms responding to that specific item. For ease of interpretation, we present the responses in descending order based on the fraction of respondents that answered 4 or 5 on a question, but in the actual survey instrument all text-based response choices to questions were listed in random order, rather than alphabetically or ranked based on our expectations.

By far the most important stated factor is “cash acts as a buffer against future cash flow shortfalls.” Almost half (47%) of the respondents rank this factor as a 4 or 5 in level of importance. This high ranking, which is significantly different from the rankings of all other responses, implies that non-operational cash has a broad use: to insure against bad future cash flow outcomes. The importance of this factor is also interesting because the factor is general in nature – that is, it does not refer to any particular outcome stemming from poor future cash flows that might worry a firm. Among the 22 factors provided as response choices, we include the particular facet of the precautionary motive cited prominently in the academic literature: that holding cash lessens the uncertainty about whether future investment opportunities can be funded. “The level of uncertainty about future investment opportunities” is ranked only fifth on the list of importance regarding why firms hold excess cash. Thus, while both factors show that firms’ demand for cash reflects precautionary motives, firms frame non-operational cash holdings as a general risk management tool, more so than related to future investment opportunities. Non-operational cash acts as a corporate insurance policy, used to maintain investments in existing projects when operating cash flows are insufficient, more so than as a source of funding for new opportunities. We examine this proposition more formally later in our analysis of the determinants of non-operational cash holdings.

Next follow five factors whose mean scores, ranging from 2.57 to 2.29, are not significantly different from each other. The first of these is “minimal cash ensures efficient running of the company.” Thirty-five percent of the respondents rank this factor 4 or 5 in importance. This response indicates that corporate managers endorse a version of the agency cost view that firms holding too much cash may not always make the best use of it. We provide a response choice that assesses this prospect more directly: “the ability to take on projects even if they do not add value to the firm.” Only eight percent of the respondents acknowledge this consideration in determining their cash levels by rating it 4 or 5 on the importance scale. It may also be the case that the concern about misusing cash does not originate from the firm, but from the investment community. That is, firms are not

worried about misusing excess funds, but they believe that investors *are* worried about this.⁶ To commit to investors that excess funds will not be misused, firms simply avoid having excess funds in the first place.

Next in the list is the cost of carry (the difference between the interest rate on debt and cash), with 35% of respondents ranking it as a 4 or 5 in importance, and the time it takes to raise money when funds are needed, with a 31% importance ranking. The latter factor is tied in its importance ranking with the level of uncertainty about future investment opportunities (discussed previously). A concern with the time it takes to raise funds is consistent with the transactions cost motive for holding cash.

Consistent with the precautionary motive, 30% of the respondents consider the ability to issue debt at a fair price an important consideration when deciding on the level of non-operational cash.

The remaining factors all have importance rankings below 30%. These factors, considered relatively unimportant when deciding on excess cash levels, include regulatory, rating agency, and lender requirements, shareholder taxes, preferences of controlling shareholders, and cash policies of industry peers.

When we consider the four primary categories into which each factor is grouped, the precautionary motive category is clearly the most important one, with an average score of 2.66, followed by direct costs, with a score of 2.01, agency costs, with a score of 1.69, and practical considerations, with a score of 1.44. These averages are all significantly different from each other.

In sum, this evidence indicates that firms' executives view excess cash mainly as insurance against cash flow shortfalls, but they are also concerned about the direct costs associated with holding and raising cash. Collectively, agency costs rank third in importance, but executives appreciate, in particular, that large excess cash holdings may result in actual or perceived inefficiencies in the running of the company.

⁶ Dittmar and Mahrt-Smith (2007), Kalcheva and Lins (2007), and Harford et al. (2008) show that firm value is inversely related to cash holdings for companies with managerial agency problems.

4.4. *Determining the size of lines of credit*

In this section, we present theoretically and practically motivated response choices that companies may consider when deciding on the size of their credit lines. The survey asks: “How important are the following factors in deciding on the size of your Line of Credit?” As before, firms were asked to rank these factors on a six-point scale from 0 to 5, where a zero indicates that the factor is not important, and a 5 indicates that the factor is very important. For this analysis, we group the factors into three broad categories: precautionary motive, direct costs, and practical considerations.

Panel B of Table 5 reports the fraction of firms ranking each factor as a 4 or a 5, as well as the mean respondent score. Two factors in particular stand out, and they are significantly different from the other responses. The first, with 69% of firms ranking it as a 4 or 5 in importance, is that the credit line is flexible and can be drawn and repaid at will. The second, with 60% of firms ranking it as a 4 or 5 in importance, is that the credit line provides certainty of funding during event risk or acquisition opportunities. The fee charged on the credit line is a distant third, with only 39% of the respondents saying that this element ranks high on the scale. A further 34% mention the time to raise funds as an important consideration, while 32% refer to the commitment fee relative to the cost of other funds. Finally, only 26% of the firms indicate that they choose the size of their credit line as a function of their commercial paper program. When we analyze the categories that correspond to each factor, we find that the precautionary motive is again the most important one, with a mean score of 2.96, followed by practical considerations (2.70), and direct costs (2.59). While these scores are all relatively close together, the score on the precautionary motive is significantly higher than the other two scores.

Based solely on these perceptual data, the differences between non-operational cash and lines of credit are nuanced. Both provide flexibility. However, as we report subsequently, more than half of the respondents do not consider these sources of liquidity to be substitutes. In the next section, we employ regression analysis to explore factors that may cause firms to consider these as substitutes, as well as factors that may affect the magnitude of each source.

5. Regression analyses

Our survey includes a number of broad questions about firms' financial choices and conditions, and we employ these responses to analyze the relation between other firm characteristics and liquidity choices. We conduct two sets of tests. First, we use a logit model to assess what factors lead firms to consider non-operational cash holdings and credit lines to be substitutes. Second, we use interval regression analysis to determine what factors affect the magnitude of non-operational cash holdings and lines of credit as a fraction of total assets.

5.1. *Logit model specification and results*

In our survey, we ask whether firms view credit lines and cash holdings as substitutes in which large lines of credit imply low cash balances and vice versa. We construct an indicator variable, which we set equal to one if firms view both forms of liquidity as substitutes and zero otherwise, and employ this indicator as the dependent variable in our logit analysis.

Forty-one percent of the sample firms view excess cash and lines of credit as substitute liquidity instruments. This survey result clearly rejects the null hypothesis that both forms of liquidity are perfect substitutes for all firms. Further, we test whether firms that *state* that they view these liquidity sources as substitutes *exhibit* a negative correlation between the ratio of non-operational cash to assets and lines of credit to assets. We find this negative relation. Among firms that consider them substitutes, the correlation is -0.35 (p-value=0.00), while the correlation is insignificant for firms that do not ($\rho=-0.03$; p-value=0.76).

Based on the discussion in Section 2, we expect certain firm attributes to be related to the view that excess cash and credit lines are substitutes. Our prediction is that firms with higher profitability and lower agency costs and firms that do not pay dividends are more likely to consider these liquidity sources as substitutes. In addition, in countries with poorly developed credit markets, we expect that these forms of liquidity are less likely to be substitutes because the funding provided by a credit line may not be consistently available.

The ratio of net income to book equity (return on equity) is a proxy for profitability. We employ two proxies for firm-level agency problems. The first measure reflects governance choices, a variable indicating whether the CEO is also the Chairman.⁷ The second measure is arguably more precise, but has a lower response rate. Recall that we asked firms whether “the ability to take on projects, even if they do not add value to the firm” was an important factor in deciding on how much excess cash to hold. Firms for which this is an important consideration are likely to suffer from more severe agency problems. Thus, we employ this response, which ranges from zero to five, as an alternate proxy for agency problems. To assess the importance of dividends, we include in the logit model a dummy if a firm paid a regular dividend over the last five years (which was one of the survey questions).

Finally, to gauge credit market development, we use private credit to GDP, as proposed by Levine, Loayza, and Beck (2000). This measure is based on the total amount of debt finance provided to private firms by all financial institutions except central banks, and captures the ease with which a country’s firms can obtain credit from external capital markets – lower scores indicate greater difficulty obtaining external credit.

Table 6 contains our findings. All models control for firm size, measured as the log of total revenues. Smaller firms may be less able to access lines of credit, and may not see these as substitutes. We also include indicator variables based on eighteen industries from which the survey participants could select as their primary line of business. All of our results hold if we estimate the models without industry effects as well.

We report two specifications, one for each measure of firm-level agency costs. In general, the results from both models are consistent with our predictions. Both models show that more profitable

⁷ Whether the separation of the CEO and Chairman roles matters for corporate governance is controversial. Brickley, Coles, and Jarrell (1997) question the efficacy of such a separation. However, government-commissioned reports in both the U.S. and the U.K. have recommended the separation of these roles and Dahya, McConnell, and Travlos (2002) find that after the adoption of such a recommendation in the U.K, CEO turnover became more sensitive to corporate performance. In addition, Efendi, Srivastava, and Swanson (2007) find that U.S. firms whose CEO is also the Chairman are more likely to have made financial misstatements.

firms, firms with lower agency costs, and firms that operate in countries with better developed credit markets are more likely to view non-operational cash and lines of credit as substitutes. Also, in model (i), we find that larger firms consider both types of liquidity as substitutes, while in model (ii), we find that non-dividend paying firms view cash and credit lines as substitutes. Also note that the measure of agency problems that is arguably more precise, namely the ability to take on projects that do not add value to the firm, enters the model at a higher level of significance.

Our findings are also economically significant. Based on model (ii) (and after setting all the other explanatory variables equal to their average), if we increase return on equity from its 25th percentile (5.33%) to its 75th percentile (17.39%), the probability that CFOs view lines of credit and non-operational cash as substitutes increases from 41% to 47%, a 15% increase in the probability. Increasing the “the ability to take on projects that do not add value to the firm” from its 25th percentile (0) to its 75th percentile (2) decreases the probability that CFOs view both forms of liquidity as substitutes from 53% to 38%.

5.2. *Non-operational cash and credit line model specifications*

We next examine the determinants of firms’ non-operational cash holdings and lines of credit. Because our dependent variables are measured in intervals, we estimate our models using interval regressions in which the exact interval endpoints are specified. That is, instead of assuming that each firm’s non-operational cash and line of credit level is at the average of its range, interval regressions allow us to specify both the upper and lower limit of each firm’s range. For example, if a firm indicates that cash/assets is in the 8.1%-10% range and that non-operational cash to total cash is in the 51%-60% range, we set the lower limit to 4.13% (8.1% x 51%) and the upper limit to 6% (10% x 60%). Coefficient estimates from these models are interpreted in a similar fashion as those from traditional linear regression models. We describe the details of interval regressions and how they apply to our sample more fully in a brief Appendix.

The firm attributes we include in our models are similar to, but do not completely span, the variables employed in prior research [see, for example, Kim, Mauer and Sherman (1998), Opler et al. (1999), Faulkender and Wang (2006), and Bates et al. (2009)]. This is because the survey design limits the breadth of variables we can assess. In particular, we do not have data on net working capital to assets, capital expenditures to assets, R&D to sales, and acquisition activity, which are all variables included in the models estimated by Bates et al. (2009). They also employ the market-to-book ratio as an explanatory variable, which we cannot use because our sample includes private companies. However, we believe that many of these variables are industry-specific, so much of their effect is likely to be captured by the industry dummies included in all of our models. Statistics for the seven firm attributes we employ were presented in Section 3.

Below, we discuss the expected relationship between these firm attributes and types of liquidity (non-operational cash holdings and credit lines). Firm size could be related to liquidity because smaller firms are likely to have larger proportional transaction costs, higher levels of information asymmetry, and less access to capital markets. As a result, they may want to obtain higher levels of both non-operational cash and lines of credit.

The effect of profitability (measured as return on equity) on non-operational cash holdings could be positive or negative. As we pointed out earlier, consistently profitable firms have a lower need for liquidity, in general. However, if cash holdings result from recent historical profits, non-operational cash may be mechanically and positively related to profitability. In terms of the size of credit lines, the relation could also be positive or negative. While consistently profitable firms may have a lower need for liquidity, Sufi (2009) points out and finds that less profitable firms may not be able to get liquidity in the form of credit lines since they are more likely to violate financial covenants.

Higher information asymmetry is likely to make external finance more costly, which makes current liquidity more desirable. Both private firms and firms listed on a stock exchange for less than five years are likely to have greater information asymmetry. Including a dummy for recent listings in

regressions also controls for the possibility that firms that went public recently may have high non-operational cash levels because they recently raised funds.

As in the logit models, we separately employ the two measures of agency problems discussed above: a CEO/Chair indicator and the score on “the ability to take on projects that do not add value to the firm” question. If firms hold cash partly because of agency reasons, we would expect to observe a positive relationship between non-operational cash holdings and our agency measures. If firm with agency problems shy away from the monitoring associated with credit lines, we would expect a negative relationship between lines of credit and our agency measures.

We also include a variable indicating whether a dividend has been paid regularly in the last five years. Its effect on non-operational cash holdings could be positive or negative. Firms that pay high dividends may be cash rich because they have been highly profitable. Alternatively, firms may view a dividend cut as a potential source of funds, lowering the need to hold cash. This latter argument also applies to the need for optional liquidity in the form of credit lines.

We control for leverage in all our models. The impact of leverage on cash holdings could be negative if leverage forces firms to pay out non-operational cash or positive if highly levered firms prefer to save cash in order to meet investment needs in the future.

We next discuss five explanatory variables employed in our regression models that are derived from perceptual questions asked in the survey:

- (1) Has the ability to raise external funds limited your ability to take on substantial investment projects? [variable ranges from 0 (not limiting) to 5 (very limiting)].
- (2) Compared to the other companies in your industry, would you describe your *need to raise capital* in the *next 5 years* as being: [variable ranges from 1 (Small Relative to Internal Resources) to 5 (Large Relative to Internal Resources)].
- (3) Compared to the other companies in your industry, would you describe your *riskiness* in the *last 5 years* as being: [variable ranges from 1 (Substantially Less Risky) to 5 (Substantially More Risky)].

- (4) An indicator variable set equal to one if the company feels that its equity is “occasionally” or “frequently” undervalued [as compared to “rarely” or “never” or “not applicable”].
- (5) An indicator variable set equal to one if a company feels that either the average credit spread currently paid on its debt is “too wide” [as compared to “fair” or “too narrow”] and/or that, if rated, its current long-term debt rating is “too low” [as compared to “fair” or “too high”].

We expect responses to each of these questions to be positively related to the need for corporate liquidity. Regarding question (1), if a lack of external funds has limited a firm’s ability to take on substantial projects in the past, it might do so again in the future; the firm may therefore try to secure additional liquidity, if possible, to ensure that such funds are available in the future. The mean firm response to whether a lack of external funds has kept the firm from undertaking substantial investment projects is a 1.4 on a scale from 0 to 5, and the median response is 1.

The second question specifically addresses the need for external capital over the next five years relative to a firm’s internal resources. The precautionary motive for corporate liquidity postulates that firms needing external funds in the future should try to obtain more funding today in case future adverse market conditions make it too costly to raise funds. Responses to this question show that firms have a relatively high need for external capital. On a 1 to 5 scale for this question, the mean score is 2.7 and the median score is 3.

Responses to the third question measure a firm’s relative risk. Riskier firms are more likely to have cash shortfalls, and thus may wish to have greater corporate liquidity to offset these shortfalls. The mean score on this question on a scale from 1 to 5 is 2.8 and the median score is 3, indicating that executives judge their firms about as risky as their industry peers.

Questions (4) and (5) capture whether a firm thinks that issuing equity or debt, respectively, may be too costly because the market undervalues these securities. If so, under the precautionary motive, additional liquidity is warranted to guard against having to pay too high a cost for future external capital. Thirty-eight percent of our firms feel that their equity is occasionally or frequently

undervalued and 24 percent feel that the spread on their debt is too wide or that their bond rating is too low.

The substitutability of liquidity is also likely to play a role. If firms view non-operational cash and lines of credits as substitute liquidity instruments, then the level of one form of liquidity will be mechanically dependent on the level of the other. In our models, we include an interaction between the indicator variable that credit lines and cash holdings are viewed as substitutes and the level of the substitute type of liquidity (to construct this variable we set the substitute type of liquidity level equal to the midpoint of its range). We expect this variable to have a negative coefficient in our models.

At the country level, we include the ratio of private credit to GDP [Levine et al. (2000)] as an explanatory variable because differences in credit market development will likely affect the demand for and supply of corporate liquidity.

Finally, liquidity needs may also vary across industries and we therefore include 18 industry controls in all models.

5.3. *Non-operational cash regression results*

Table 7 reports interval regressions in which the dependent variable is non-operational cash as a fraction of total book assets. Panel A includes the firm attribute variables. These models are comparable to extant models based solely on financial statement data employed in prior research on corporate liquidity. In Panel B, the models include the perceptual question response variables as well as firm attribute variables. The models in Panel B have fewer observations due to lower response rates for the perceptual questions relative to the firm attribute questions. As in the logit models, we present two specifications in each panel, one for each measure of agency costs.

In Panel A of Table 7, we find that several of the potential determinants of non-operational cash holdings are significant in at least one of the two models. The coefficient in model (ii) for private firms indicates that these firms hold 1.9 percentage points more non-operational cash than other companies. To the extent that private firms have greater information asymmetry associated with them,

or might have fewer sources of borrowing in general, this finding is consistent with the previous discussion that an increase in liquidity of any type is beneficial for such firms. Given that median non-operational cash holdings are only 2% of total assets, this effect is large from an economic perspective. The second model also shows that dividend paying firms hold about 1.8 percentage points more non-operational cash, which is again economically significant. This result is consistent with our discussion in Section 2 that firms wishing to maintain a consistent dividend policy will prefer to hold more non-operational cash. The first model shows that more levered firms have less non-operational cash; while we are hesitant to draw strong inferences regarding leverage because it is not significant in any of the Panel B models, it suggests that firms that have to make debt payments cannot easily accumulate excess cash.

Non-operational cash holdings are positively related to private credit to GDP in both models of Panel A (as well as in both models of Panel B). As discussed earlier, Dittmar et al. (2003) and Kalcheva and Lins (2007) find the same result when they study total cash holdings, and they attribute the result to agency problems in which managers and controlling shareholders hoard cash that can be used at some point for their own private benefit. Thus, our country-level results for non-operational cash are consistent with prior findings.

We now turn to Panel B of Table 7, where we include the responses to the perceptual survey questions discussed in Section 5.2. Only one of the responses to these questions is significant: the stated need for external capital in the next five years, relative to internal resources. Under the precautionary motive, if a firm wishes to build its strategic cash reserves before it needs external capital in the future, this coefficient is expected to be positive. However, the coefficient on future external capital needs is negative. There are two possible interpretations of this finding: (1) despite limited internal resources, firms do not use non-operational cash to guard against the possibility that funds needed for growth in the future will be relatively expensive, or (2) the causality is reversed: firms state that they need to raise funds in the future because they cannot obtain the funds today; that is, they are already constrained. To help us distinguish between interpretations (1) and (2), we re-

estimate the models of Panel B for firms unlikely to be financially constrained. These firms could obtain cash today to lessen the risk that it will be too costly to obtain funds in the future. If unconstrained firms choose not to obtain the cash today, the reverse causality argument is less likely to hold. Based on the extant literature, we employ two measures of the lack of constraints: (a) the firm has a bond rating (82 firms in our sample); and (b) the firm pays a dividend (150 firms in our sample). For both samples, we continue to find a negative relationship between non-operational cash holdings and the perceived need for external capital (results not tabulated). Given these additional tests, the explanation that firms do not use non-operational cash to guard against the possibility that future funds needed for growth will be too costly, receives more support. In the next subsection, we investigate whether the need for future funds is met through lines of credit instead.^{8,9}

Finally, we note that firms with credit lines that also view these credit lines as a substitute for holding cash tend to have less non-operational cash, as would be expected.

When we look at the firm attribute variables that were also included in the models in Panel A, we continue to find that being a private or dividend paying firm is positively related to non-operational cash levels in one of the two models. In addition, the coefficient on firm size is now significantly negative in one of the models. The size result is consistent with the idea that smaller firms have both greater transaction costs and information asymmetry, both of which make corporate liquidity more valuable. We also find that the coefficient on “listed its stock in the past five years” is now positive and significant. This result is consistent with two explanations: (a) these firms have greater asymmetric information and want to hold more non-operational cash as a result, and/or (b) these firms obtained an influx of cash when they listed their shares.

⁸ We also verified this interpretation of our findings during several practitioner seminars organized by Deutsche Bank to present the survey findings.

⁹ Sufi (2009) finds that lack of access to a line of credit is a more statistically powerful measure of financial constraints than other measures traditionally used in the literature. It would be less suitable to use this as a measure of financial constraints in these tests because, in our next set of tests, we directly assess whether the factors employed in Panel B also relate to the magnitude of credit lines. That said, we do find that unconstrained firms, as measured by the presence of a significant credit line, choose not to build up cash reserves when they have high perceived external capital needs, but such a finding is not surprising.

5.4. *Line of Credit regression results*

Table 8 reports interval regressions in which the firm's line of credit to total book assets is the dependent variable. As in Table 7, the models in Panel A include firm attributes while the models in Panel B include survey response variables as well as firm attributes; we report two specifications, one with each agency cost proxy.

Of the firm attribute variables, the first row of the table shows that smaller firms have proportionally larger credit lines. Again, such firms could benefit from having larger credit lines given the benefit from increased liquidity in general for firms likely to face higher transaction costs and information problems. The other firm attribute variables are insignificant in both panels.

New findings emerge from the country-level measure of credit market development in Table 8. Both models in Panels A and B show that lines of credit are larger when private credit markets are less developed, which supports the precautionary motive for holding liquidity. Thus, if a firm expects it to be difficult to obtain cash via a spot loan from a bank at any given point in time, a contract that allows it to instantly tap such bank credit is valuable. In terms of economic significance, decreasing Private Credit to GDP from its 75th percentile (1.59) to its 25th percentile (0.72) leads to an increase in credit lines to assets of between three and five percentage points, depending upon the model. The sample median line of credit to assets is 15%, so this represents about a 30% increase from the median. Note that in Table 7 we did not find that the precautionary motive for liquidity applies to cash because non-operational cash holdings are lower, rather than higher, when credit markets are less developed.

In Panel B of Table 8, we include the responses to the perceptual questions. Firms that state a strong need for external capital in the future have larger lines of credit, contrary to our findings for non-operational cash (Table 7). This implies that firms that expect to need external capital in the future make provisions to improve their liquidity, but they do so by using lines of credit rather than cash. This is consistent with firms using an option-like liquidity instrument to fund future investment opportunities. From an economic standpoint, an increase in external capital needs from the 25th

percentile (2) to the 75th percentile (4) corresponds to a 2.70 percentage point increase in lines of credit to assets (based on model (i)). For a firm with the median line of credit to assets ratio of 15%, this represents an increase of almost 20%.

Panel B also shows that firms that believe their equity is undervalued have higher lines of credit. No such result was found for non-operational cash holdings. Firms with undervalued equity have lines of credit to assets that are 3.8 percentage points higher than other firms (based on model (i)). However, the relationship between undervaluation and credit lines appears to be just an equity phenomenon because there is no relationship between credit lines and a perception that credit spreads are too wide or debt ratings are too low. One potential explanation for this lack of a positive relation is that if a firm that believes it pays too much for debt it may not want a larger credit line because, being a debt contract, it too could seem very costly. Finally, we find that, as expected, firms that hold more non-operational cash and view cash and credit lines as substitutes have lower lines of credit.

Summarizing our regression results, Table 8 shows that firms that need future external capital and firms whose equity is occasionally or frequently undervalued make relatively greater use of lines of credit. Firms with these characteristics are likely to have substantially better growth opportunities than perceived by the market. To ensure that they can capitalize on these opportunities, these firms hold options to obtain future cash via lines of credit. Recall that Table 7 shows that neither of these characteristics is related to non-operational cash. This suggests that excess cash is less likely held to take advantage of growth opportunities. Instead, as indicated in the survey responses tabulated in Table 5, non-operational cash is employed as a corporate insurance policy. Taken together, the results presented in our tables indicate that CFOs use different liquidity instruments to ensure that their liquidity adequately spans potential future economic conditions. Unconditional liquidity (cash) is used primarily when a guarantee is particularly important – to provide insurance against cash flow shortfalls when the firm is faring poorly. Conditional liquidity (a line of credit) represents an option that can generally be exercised only when the firm and its banks are faring well, so it is used to fund future growth opportunities likely to arise in good economic times. Note that lines of credit are not a

permanent solution to the lack of investment funding, however, because they are generally not longer than five years in duration.¹⁰

Further, at the country level, lines of credit are a decreasing function of credit market development, consistent with the precautionary motive for corporate liquidity, while non-operational cash holdings are positively related to credit market development, consistent with the agency cost explanation.

Before moving to our final analysis, we note that for all of our regressions there is a potential concern that country-level factors other than those captured by credit market development might ultimately be driving levels of corporate liquidity. To account for this possibility, we incorporate country random effects into our interval regression models. These models acknowledge possible dependence of errors within countries and also allow for both within- and between-country variation in the explanatory variables. All of our results hold both in magnitude and significance when a country random effects specification is used.

5.5. *Are total cash holdings a good proxy for non-operational cash holdings?*

Next, we analyze whether total cash holdings, which, due to data constraints, have traditionally been employed in research on the determinants of corporate liquidity, are an adequate proxy for non-operational cash holdings. This is important because most research questions are fundamentally about non-operational cash, not total cash. We have commented earlier that non-operational cash holdings are much smaller than total cash holdings. However, we do not know whether the economic inferences drawn from models based on non-operational cash holdings are similar to those based on models of total cash. If we find the inferences to be similar, this validates the use of total cash as a proxy for non-operational cash.

¹⁰ We base this statement on private conversations with several U.S. bankers who indicate that for large U.S. firms the typical credit line maturity ranges from 3 to 5 years. We also read the annual reports (20-Fs) of a sample of 9 non-U.S. corporations with NYSE-listed ADRs to obtain data on credit line maturity. One firm has a 6-year line of credit, five firms have a 5-year credit line, two firms have a 3-year credit line, and one firm reports that its credit line has an “indefinite” maturity.

To investigate this issue, we first compute the correlation between total cash holdings and non-operational cash holdings and find it to be 0.75 (p-value=0.00). This high level of correlation indicates a strong mapping between the two measures of cash. Second, we re-estimate the four models in Table 7 (recall that there are two models each for Panels A and B), but replace non-operational cash holdings by total cash holdings. The inferences are similar, and, with one exception, all of the explanatory variables that have a significant coefficient in at least one of the four models of Table 7 also have a significant and similarly signed coefficient in at least one of the total cash models. The exception is the impact of profitability: while more profitable firms have higher total cash holdings, this is not reflected in their levels of non-operational cash. Thus, it appears that more profitable firms have higher cash levels for operational reasons. Therefore, unless the purpose of the study is to investigate the relationship between profitability and cash holdings, we believe that total cash is a reasonable proxy for non-operational cash when assessing the determinants of a firm's cash policy.

6. Limitations of Survey Analysis

We note here that, as with any survey, there are potential limitations to the inferences that can be drawn from the analysis. Several types of concerns can arise. The first is the risk that the survey questions are misunderstood. While it is not possible to verify that each respondent fully understood each of the questions, we went to some lengths to test, and confirm, that the survey questions were generally well understood. Before launching the survey, a beta version was discussed with a number of CFOs to make sure there were no misunderstandings. Also, after analyzing the results, the survey findings were presented at several practitioner seminars, where participants confirmed their understanding of the survey questions. Moreover, if respondents inconsistently interpreted particular questions, this would weaken our ability to uncover the cross-sectional results reported previously. The fact that we uncover economically meaningful relationships between the survey responses and firm characteristics is evidence that, in aggregate, respondents understood the intent of our questions.

A second concern regarding survey analysis is the possibility that our respondents are not representative of the population of firms which were sent the survey instrument. Additionally, even among the firms that responded to the survey, some chose to complete the section on corporate liquidity, while others did not. The survey was sent to the largest companies in each particular country and industry. We conduct three sets of tests to assess whether respondent firms are representative of this overall sample of firms worldwide. First, as discussed in the text, we find that the characteristics of the firms in our sample are similar to those studied in international research based on archival data, except that our sample firms are larger. This suggests that the firms that chose to respond to our survey are generally representative of a wider cross-section of firms. Second, we have also compared the industry composition of respondent and non-respondent firms and find it to be similar. Third, we test for differences between the firms responding to the liquidity management part of the survey and those who did not. We find no differences in the variables we employ in our regressions between the two groups, with one exception: firms that respond to the liquidity questions are more likely to pay dividends. Taken together, these tests indicate that response bias is unlikely to be a major concern for our survey data.

Another concern that arises in survey data is that respondents may choose not to answer questions truthfully. Because our survey is completely anonymous, we do not believe there would be any systematic reason for respondents to answer questions in anything other than a truthful manner. Additionally, as pointed out by Graham and Harvey (2001) for their large-scale survey instrument, it is unlikely that corporate executives would take the time to respond to a lengthy survey if their intent was to be untruthful.

Summarizing, the firms that responded to the survey appear to be broadly representative of the international firms typically used in other corporate finance research based on archival data and the respondent firms appear to have understood the questions asked. We also believe that respondents answered our questions truthfully. Nonetheless, the analysis presented in this paper and inferences

drawn from it must be interpreted with the understanding that our data come from a survey rather than from archival data obtained from a comprehensive global data provider.

7. Conclusion

Corporate executives care deeply about the management of corporate liquidity. While this topic receives relatively little attention in MBA programs (including ours), CFOs deem it to be among the most valuable parts of their financial activities. It is therefore important to understand how and why executives manage this essential activity.

This paper uses survey evidence for firms from 29 countries to assess the magnitude and determinants of corporate liquidity around the world, and to gain insight into how managers trade off the costs and benefits of these different forms of liquidity. The survey provides detailed information on corporate liquidity that cannot be obtained from publicly available financial statement data. In particular, the survey provides data on the magnitude of credit lines and of cash held for non-operational purposes, on whether CFOs consider these to be substitute liquidity sources, on specific factors considered by CFOs when making decisions on liquidity, and on future capital needs and perceived misvaluation in securities markets.

Several new findings emerge. First, lines of credit are the dominant source of liquidity for most corporations around the world, amounting to 15% of assets. Second, less than half of the cash on companies' books is being held for non-operational purposes, amounting to just 2% of assets. Third, managers are more prone to view cash and lines of credit as substitutes when they are more profitable, suffer less from agency problems, do not pay dividends, and operate in countries with more developed credit markets. Fourth, to the extent they are imperfect substitutes, the two types of liquidity are held for different reasons. Our data indicate that non-operational cash is employed as a general insurance policy against poor cash flow realizations; firms with either higher needs for external funding in the future or a belief that their equity is undervalued do not hold extra cash today. Thus, the precautionary motive, which asserts that realized liquidity is valuable to fund future growth opportunities or to avoid

issuing expensive capital, does not appear to apply to non-operational cash. Lines of credit, on the other hand, are employed when future external financing needs are high, managers believe that their equity is undervalued, and credit market development is poor, all of which are consistent with the precautionary motive for corporate liquidity.

Overall, our study on the substitutability and levels of non-operational cash and lines of credit points to a common theme. The unconditional liquidity provided by non-operational cash is held to guard against future cash flow shocks in bad times, while the conditional liquidity provided by credit lines gives firms the option to exploit future business opportunities available in good times. Put another way, we conclude from our tests that excess cash is held as general purpose insurance and lines of credit are held to fund future growth options.

Our survey was conducted in 2005, before the recent credit crisis, but it foreshadowed some of what transpired. Campello, Giambona, Graham, and Harvey (2009) survey financial executives in the wake of the crisis, and their findings corroborate ours: that lines of credit are an important source of liquidity, credit lines are indeed conditional, and that the relationship between cash and lines of credit is neither simple nor mechanical. Well before the credit crisis, executives were concerned with managing their firms' liquidity, and they made their liquidity decisions primarily based on the precautionary motive. They also appreciated the similarities as well as the nuanced differences between holding non-operational cash and obtaining lines of credit and, as a result, did not see them as perfect substitutes. Taken together, our findings imply that it is important to consider all facets of corporate liquidity to obtain a more comprehensive picture of the determinants of liquidity policy.

Appendix – Interval Regressions

Interval regressions are used in our analysis of the magnitude of non-operational cash holdings and lines of credit because we observe the data for our dependent variables only in categories rather than in its original form as discrete variables. Below, we discuss the procedure employed to estimate interval regressions.

Assume the following linear regression model: $y = X\beta + \varepsilon$, where y is a vector of the continuous outcomes, either observed or unobserved, X is a matrix of explanatory variables, and β is a vector of regression coefficients. ε is distributed normally with a mean of 0 and a standard deviation of σ^2I , where I is the identity matrix.

The observations fall into various sets. The first set consists of cases where the actual outcome can be observed. In our non-operational cash models, these are firms with zero non-operational cash, and in our line of credit models, these are firms without credit lines. The second set consists of observations that are left-censored, where we know that the unobserved y_j is less than y_{LOW} , a censoring variable that is known. There are no such observations in our sample because we know that the minimum level of non-operating cash and the minimum level of credit lines is zero. The following k sets (numbered from 3 to $k+2$) consist of firms whose unobserved y_j is in an interval ($LOW SET_i, HIGH SET_i$), where i refers to the set number. For lines of credit, we have ten such sets; firms with a credit line had 11 size categories to choose from, but the top category has no upper bound. For non-operational cash holdings, we have 137 sets because the minimum and maximum levels of non-operational cash are computed by multiplying the minimum and maximum levels of total cash with the minimum and maximum ratio of non-operational cash to total cash, leading to many different intervals. Finally, there is a set (numbered $k+3$) that consists of observations that are right-censored where we know that the unobserved y_j is higher than y_{HIGH} , a censoring variable that is known. There are no such observations in our sample for non-operational cash because we know that

the maximum is 100%. There are 91 observations in our sample for lines of credit; these are firms whose line of credit exceeds 20% of assets (and could therefore potentially exceed 100% of assets).

We then construct the following log likelihood function and estimate the model with maximum likelihood:

$$\begin{aligned} \ln L = & -\frac{1}{2} \sum_{j \in \text{Set}_1} \left[\left(\frac{y_i - x\beta}{\sigma} \right)^2 + \log 2\pi\sigma^2 \right] + \sum_{j \in \text{Set}_2} \left[\log \Phi \left(\frac{y_{LOW} - x\beta}{\sigma} \right) \right] + \\ & \sum_{i=3}^{k+2} \sum_{j \in \text{Set}_i} \log \left[\Phi \left(\frac{y_{HIGH \text{ SET}_i} - x\beta}{\sigma} \right) - \Phi \left(\frac{y_{LOW \text{ SET}_i} - x\beta}{\sigma} \right) \right] + \\ & \sum_{j \in \text{Set}_{k+3}} \log \left[1 - \Phi \left(\frac{y_{HIGH} - x\beta}{\sigma} \right) \right] \end{aligned}$$

Where $\phi()$ is the standard cumulative normal and k is the number of sets with both a lower and upper limit specified. For completeness, the above equation includes Set 2, which consists of left censored observations, but as we pointed out above, there are no such observations in our sample. Note that this approach is just a generalization of Tobit and censored regression models. Tobit models would include the first, second, and fourth elements of the above equation, while censored models would include the third element of the above equation. For a further description of interval regression techniques, see Amemiya (1973).

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Table 1
Distribution of sample firms by country of origin

<i>Country</i>	<i>Number of Firms</i>
Argentina	1
Australia	1
Austria	3
Belgium	11
Chile	6
Denmark	2
Finland	1
Germany	46
Hong Kong, China	1
India	6
Indonesia	3
Italy	9
Japan	16
Korea (South)	6
Malaysia	3
Netherlands	4
New Zealand	4
Norway	1
Philippines	6
Portugal	2
Singapore	2
South Africa	3
Spain	11
Sri Lanka	2
Sweden	3
Switzerland	14
Taiwan	6
United Kingdom	15
United States	18
Total	204

Table 2
Summary statistics for sample firms

The table reports mean and median values for fundamental firm characteristics for our sample of 204 firms. Revenue is converted to U.S. dollars using prevailing exchange rates at the end of October 2005. Return on equity refers to the ratio of net income to book equity. Leverage is measured as total liabilities divided by total assets. Indicator variables are as described in the table and are set equal to 1 if the attribute is true, and zero otherwise.

Variable	Mean	Median
Log of revenues in billions of U.S. dollars	7.2	1.6
Return on equity	0.12	0.11
Leverage	0.57	0.58
Private (i.e., non-listed) firm indicator	0.34	0
Listed on exchange less than 5 years indicator	0.10	0
CEO is also Chairman of Board indicator	0.48	0
Firm has paid a regular dividend in past 5 years indicator	0.73	1

Table 3
Distribution of cash holdings as a percentage of book assets in 2005

This table lists the various categories of total cash to assets provided to survey respondents (column (i)) and the percentage of firms that fall into each category (column (ii)). Column (iii) contains the median percentage non-operational cash to total cash for each category of total cash to assets

Total cash / Assets (%)	Percentage of firms in each category	Median Percentage Non- operational Cash to Total Cash
(i)	(ii)	(iii)
0-2	18	1-10
2.1-4	9	1-10
4.1-6	9	1-10
6.1-8	9	21-30
8.1-10	9	41-50
10.1-12	6	21-30
12.1-14	8	51-60
14.1-16	4	61-70
16.1-18	4	61-70
18.1-20	5	21-30
Over 20	20	31-40

Table 4
Distribution of lines of credit as a fraction of book assets in 2005

This table lists the various categories of total credit lines to assets provided to survey respondents (column (i)) and the percentage of firms that fall into each category (column (ii)). Column (iii) contains the median percentage non-operational cash to total cash for each category. This percentage is computed by assuming that a firm's level of cash to assets and non-operational cash to total cash is at the midpoint of its indicated range.

Lines of Credit / Assets (%)	Percentage of firms in each category	Median percentage Non- operational Cash / Assets
(i)	(ii)	(iii)
No line of credit	6	14.00
0-2	6	0.60
2.1-4	6	0.75
4.1-6	6	5.80
6.1-8	4	5.50
8.1-10	10	3.15
10.1-12	9	2.10
12.1-14	2	0.50
14.1-16	4	0.70
16.1-18	3	2.40
18.1-20	5	0.60
Over 20	39	1.00

Table 5
Survey responses to questions about non-operational cash and lines of credit

Panel A: Answers to the question: “In deciding how much Excess Cash to hold, how important are the following factors?”

Scale is Not Important (0) to Very Important (5)	Primary Category of Explanation	% 4 or 5 Score	Mean Score	N
Cash as a buffer against future cashflow shortfalls	Precautionary	47	3.04	188
Minimal cash ensures efficient running of the company	Agency costs	35	2.57	182
Difference between interest rate on cash and interest rate on debt	Direct costs	35	2.50	184
Time it takes to raise money when funds are needed	Precautionary	31	2.43	187
Level of uncertainty about future investment opportunities	Precautionary	31	2.36	186
Ability to issue debt at a “fair” price when funds are needed	Precautionary	30	2.29	187
Difference between interest rate on cash and cost of capital	Direct costs	26	2.19	182
Size of the undrawn credit facility	Practical	23	2.06	182
Transaction costs of raising funds	Direct costs	22	1.96	184
Difference between int. rate on cash and return on other projects	Direct costs	19	1.93	181
Ability to issue equity at a “fair” price when funds are needed	Precautionary	19	1.77	181
Using cash to retire debt moves company below target debt level	Practical	18	1.64	181
Tax that shareholders would pay if company paid out cash	Direct costs	13	1.48	183
Preference of controlling shareholders	Agency costs	13	1.40	182
Rating agency requirements	Practical	12	1.45	179
Signals associated with drawing down the undrawn credit facility	Practical	10	1.49	174
Other lender requirements	Practical	10	1.23	180
Regulatory requirements	Practical	9	1.13	178
Contingent liabilities (e.g., possible future litigation exposures)	Precautionary	8	1.37	179
Ability to take on projects even if they do not add value to the firm	Agency costs	8	1.08	182
Cannot apply cash to retire debt without incurring acct. charges	Practical	7	1.39	176
Cash holdings of other companies in my industry	Practical	4	1.21	182
Precautionary motive			2.66	179
Direct costs			2.02	179
Agency costs			1.69	182
Practical considerations			1.44	165

Panel B: Answers to the question: “How important are the following factors in deciding on the size of your Line of Credit”

Scale is Not Important (0) to Very Important (5)	Primary Category of Explanation	% 4 or 5 Score	Mean Score	N
Credit facility is flexible: can be drawn and repaid at will	Practical	69	3.70	215
Certainty of funding during event risk or acquisition opportunities	Precautionary	60	3.48	208
The fee charged on the credit line	Direct costs	39	2.89	210
The time it takes to raise funds through other means	Precautionary	34	2.79	206
The cost of the credit facility is certain	Precautionary	32	2.75	207
Transaction costs of raising funds through other means versus the commitment fee	Direct costs	30	2.34	203
Company’s commercial paper program requires a backstop facility	Practical	26	1.75	204
Precautionary motive			2.96	197
Practical considerations			2.70	201
Direct costs			2.59	201

Table 6
Logistic regression models – Are credit lines and cash holdings substitutes?

The dependent variable is an indicator variable which is set equal to one if firms state that they view credit lines and cash holdings as substitutes. Independent variables obtained from various portions of the survey are also included. These variables are: the ratio of net income to book equity (return on equity); a variable indicating whether the CEO is also the Chairman; the response to whether “the ability to take on projects, even if they do not add value to the firm” is an important factor in deciding on how much excess cash to hold, a measure which ranges from zero to five; and a variable indicating whether a firm paid a regular dividend over the last five years. Industry indicator variables categorize a firm’s primary operations into one of 18 industry category choices presented in the survey. Private credit to GDP, a measure which ranges from 0.08 to 2.17, is obtained from Levine, Loayza, and Beck (2000). The *p-value* of a two-tailed test of equality of each coefficient to zero is reported in parentheses.

	(i)	(ii)
Log of revenue in millions of U.S. dollars	0.169 (0.06)	0.082 (0.42)
Return on equity	1.282 (0.10)	1.818 (0.08)
CEO is also Chairman of Board indicator	-0.536 (0.09)	
Importance of “the ability to take on projects, even if they do not add value to the firm” when deciding on excess cash		-0.319 (0.02)
Firm has paid a regular dividend in past 5 years indicator	-0.561 (0.12)	-0.768 (0.06)
Private credit to GDP	0.511 (0.10)	0.632 (0.08)
Industry indicator variables included?	Yes	Yes
Number of observations	202	168
Pseudo R-squared	0.110	0.109

Table 7
Non-operational cash regression models

The dependent variable is non-operational cash (referred to in the global CFO survey as excess cash) as a proportion of book assets. All models are estimated using interval regressions with robust standard errors. Independent variables obtained from various portions of the survey instrument are also included. These variables are: the ratio of net income to book equity (return on equity); a variable indicating whether the firm is privately held (i.e., non-listed); a variable indicating whether the firm has been listed on a stock exchange for less than 5 years; a variable indicating whether the CEO is also the Chairman; the response to whether “the ability to take on projects, even if they do not add value to the firm” is an important factor in deciding on how much excess cash to hold, a measure which ranges from zero to five; leverage, as measured by the ratio of total liabilities to total assets; and a variable indicating whether a firm paid a regular dividend over the last five years. Industry indicator variables categorize a firm’s primary operations into one of 18 industry category choices presented in the survey. Private credit to GDP, a measure which ranges from 0.08 to 2.17, is obtained from Levine, Loayza, and Beck (2000). Panel A includes firm attribute variables and Panel B includes these attribute variables as well as firm responses to perceptual questions. The *p-value* of a two-tailed test of equality of each coefficient to zero is reported in parentheses.

Panel A: Models with firm attribute variables

	(i)	(ii)
Log of revenue in millions of U.S. dollars	-0.219 (0.33)	-0.295 (0.25)
Return on equity	1.073 (0.38)	2.408 (0.28)
Private (i.e., non-listed) firm indicator	0.713 (0.45)	1.897 (0.09)
Listed on exchange less than 5 years indicator	1.889 (0.14)	1.082 (0.43)
CEO is also Chairman of Board indicator	0.617 (0.40)	
Importance of “the ability to take on projects, even if they do not add value to the firm” when deciding on excess cash		0.207 (0.48)
Leverage	-2.709 (0.10)	-1.979 (0.29)
Firm has paid a regular dividend in past 5 years indicator	1.443 (0.12)	1.779 (0.08)
Private credit to GDP	1.782 (0.02)	2.036 (0.02)
Industry indicator variables included?	Yes	Yes
Number of observations	202	164
Wald Chi2	57.58	51.62

Panel B: Models with firm attribute and survey response variables

	(i)	(ii)
Log of revenue in millions of U.S. dollars	-0.198 (0.39)	-0.474 (0.07)
Return on equity	1.996 (0.30)	3.028 (0.16)
Private (i.e., non-listed) firm indicator	1.117 (0.29)	1.958 (0.09)
Listed on exchange less than 5 years indicator	3.115 (0.02)	1.873 (0.17)
CEO is also Chairman of Board indicator	0.486 (0.51)	
Importance of “the ability to take on projects, even if they do not add value to the firm” when deciding on excess cash		0.225 (0.44)
Leverage	-1.364 (0.42)	0.041 (0.98)
Firm has paid a regular dividend in past 5 years indicator	1.545 (0.10)	2.283 (0.02)
State lack of external funds has limited taking on substantial projects	0.239 (0.38)	0.040 (0.89)
Stated need for external capital next 5 years relative to industry peers	-0.645 (0.05)	-0.734 (0.03)
Stated level of riskiness in past 5 years relative to industry peers	0.120 (0.79)	0.302 (0.54)
State that your equity is occasionally or frequently undervalued	0.240 (0.78)	0.948 (0.29)
State that your debt spread is too wide or your debt rating is too low	0.507 (0.57)	-0.116 (0.90)
Indicator that credit lines and cash are substitutes multiplied by non-operational cash/assets	-0.063 (0.00)	-0.087 (0.00)
Private credit to GDP	1.795 (0.02)	1.920 (0.02)
Industry indicator variables included?	Yes	Yes
Number of observations	180	150
Wald Chi2	73.55	51.62

Table 8
Line of credit regression models

The dependent variable is a firm's line of credit as a proportion of book assets. All models are estimated using interval regressions with robust standard errors. Independent variables obtained from various portions of the survey are also included. These variables are: the ratio of net income to book equity (return on equity); a variable indicating whether the firm is privately held (i.e., non-listed); a variable indicating whether the firm has been listed on a stock exchange for less than 5 years; a variable indicating whether the CEO is also the Chairman; the response to whether "the ability to take on projects, even if they do not add value to the firm" is an important factor in deciding on how much excess cash to hold, a measure which ranges from zero to five; leverage, as measured by the ratio of total liabilities to total assets; and a variable indicating whether a firm paid a regular dividend over the last five years. Industry indicator variables categorize a firm's primary operations into one of 18 industry category choices presented in the survey. Private credit to GDP, a measure which ranges from 0.08 to 2.17, is obtained from Levine, Loayza, and Beck (2000). Panel A includes firm attribute variables and Panel B includes these attribute variables as well as firm responses to perceptual questions. The *p-value* of a two-tailed test of equality of each coefficient to zero is reported in parentheses t.

Panel A: Models with firm attribute variables

	(i)	(ii)
Log of revenue in millions of U.S. dollars	-1.076 (0.03)	-0.954 (0.07)
Return on equity	2.849 (0.50)	2.656 (0.55)
Private (i.e., non-listed) firm indicator	-2.014 (0.35)	-1.802 (0.45)
Listed on exchange less than 5 years indicator	0.589 (0.83)	1.610 (0.57)
CEO is also Chairman of Board indicator	-0.842 (0.60)	
Importance of "the ability to take on projects, even if they do not add value to the firm" when deciding on excess cash		0.971 (0.18)
Leverage	5.029 (0.16)	1.901 (0.62)
Firm has paid a regular dividend in past 5 years indicator	0.237 (0.91)	1.101 (0.61)
Private credit to GDP	-5.480 (0.00)	-3.959 (0.03)
Industry indicator variables included?	Yes	Yes
Number of observations	204	165
Wald Chi2	46.66	45.17

Panel B: Models with firm attribute and survey response variables

	(i)	(ii)
Log of revenue in millions of U.S. dollars	-0.894 (0.09)	-0.896 (0.13)
Return on equity	2.553 (0.54)	1.639 (0.71)
Private (i.e., non-listed) firm indicator	0.552 (0.81)	1.457 (0.59)
Listed on exchange less than 5 years indicator	3.284 (0.27)	3.999 (0.20)
CEO is also Chairman of Board indicator	-0.827 (0.60)	
Importance of “the ability to take on projects, even if they do not add value to the firm” when deciding on excess cash		0.349 (0.60)
Leverage	2.142 (0.58)	-0.687 (0.88)
Firm has paid a regular dividend in past 5 years indicator	1.503 (0.48)	2.372 (0.31)
State lack of external funds has limited taking on substantial projects	0.686 (0.25)	0.439 (0.52)
Stated need for external capital next 5 years relative to industry peers	1.351 (0.05)	1.501 (0.05)
Stated level of riskiness in past 5 years relative to industry peers	1.196 (0.23)	1.541 (0.16)
State that your equity is occasionally or frequently undervalued	3.843 (0.04)	5.210 (0.01)
State that your debt spread is too wide or your debt rating is too low	-0.219 (0.91)	-0.742 (0.72)
Indicator that credit lines and cash are substitutes multiplied by non-operational cash/assets	-0.217 (0.01)	-0.221 (0.01)
Private credit to GDP	-3.736 (0.03)	-3.097 (0.09)
Industry indicator variables included?	Yes	Yes
Number of observations	179	150
Wald Chi2	64.88	56.06