

# Access to Liquidity and Corporate Investment in Europe During the Credit Crisis of 2009\*

Murillo Campello  
University of Illinois  
& NBER  
campello@illinois.edu

Erasmus Giambona  
University of Amsterdam  
e.giambona@uva.nl

John R. Graham  
Duke University  
& NBER  
john.graham@duke.edu

Campbell R. Harvey  
Duke University  
& NBER  
cam.harvey@duke.edu

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## Abstract

*This paper investigates a unique dataset describing how public and private firms in Europe use lines of credit during the 2008-9 financial crisis. Our analysis emphasizes the interaction between internal funds, external funds, and real decisions such as corporate investment and employment. Among other things, we find that firms that generally face restricted access to credit (small, private, non-investment grade, and unprofitable) draw more funds from their credit lines during the crisis than their large, public, investment-grade, profitable counterparts. The terms of credit line facilities changed significantly with the crisis: maturities declined, while commitment fees and interest spreads went up. Our evidence suggests that while being profitable helps firms establish credit lines, it does not monotonically lead to increased use. Instead, lines of credit are used when internal funds (cash stocks and cash flows) decline. Looking at real-side decisions, our estimates suggest that lines of credit provide the liquidity "edge" firms need to invest during the crisis.*

Key words: Financial crisis, investment spending, liquidity management, lines of credit.  
JEL classification: G31.

\*We thank *CFO* magazine for helping us conduct the survey, though we note that our analysis and conclusions do not necessarily reflect those of *CFO*.

## **1. Introduction**

One of the central questions in corporate finance concerns the link between access to finance and real activities. Identifying the direction of this relation is challenging because access to credit and real outcomes often move together. Scarcity of credit characterizes the financial crisis of 2008-9. We rely on this characterization of the crisis to draw sharp inferences on how firms manage internal and external liquidity and on how the interaction between the different sources of liquidity facilitates corporate investment and other real-side activities.

There is a long literature on the importance of internal funds as a source of financing for corporate investment. According to this literature, profits are likely to become a crucial funding source when firms face financing constraints (Fazzari et al. (1988)) or when credit is tight in the aggregate economy (Bernanke and Gertler (1989)). In this paper, we study the interaction between different sources of corporate funding and how that interaction affects capital investment. We do this using data collected in the midst of the 2009 financial crisis with a focus on European firms. While previous papers consider the impact of firms' internal liquidity (namely, cash holdings and cash flows) on their real policy variables, we focus on bank lines of credit.

The importance of committed credit facilities provided by banks for firms' activities is recognized in the literature (see, e.g., Shockley and Thakor (1997)). Even so, little is known about the determinants of credit line use. Theory suggests that a bank line of credit can function as an insurance policy against liquidity shortages (Thakor (1995) and Holmstrom and Tirole (1998)). Credit lines work particularly well during times when firms have limited access to the capital markets, and differently from cash, credit lines have very low carry costs. The optionality of access to liquidity that is created by credit lines raises a number of questions. Who uses lines

of credit when capital markets fail? How do credit lines interact with internal liquidity? Are these sources of liquidity substitutes or complements during a liquidity crisis? How are these credit facilities priced? Does line of credit access affect real-side decisions such as investment and employment? In this paper, we study these and a number of related questions. We do so by examining the role played by credit lines in Europe during the 2008-9 financial crisis, a time in which there was both an aggregate credit supply shortage and much variation in credit demand by firms.

Our analysis is based on a survey of 561 CFOs from Europe and North America in early 2009. We focus on the European data, but compare the European results with the U.S. evidence to give an international context to our findings. In the survey, we ask CFOs about their holdings of cash, their access to bank lines of credit, their use of available lines (drawdown decisions), the costs associated with credit lines (e.g., commitment fees), and their *planned (ex-ante)* expenditure policies regarding investment, technology, and employment.

To assess the impact of liquidity management on real corporate policies during the credit crisis, we need to understand the determinants of establishing and using lines of credit. We also need to learn more about drawdown policies and the pricing of credit facilities. Empirical work on this important source of financing is very limited because data on lines of credit are not available from standard data sources. Accordingly, the first part of our analysis describes determinants of lines of credit, drawdown activities, pricing and maturity, and the relation between cash holdings (internal liquidity) and lines of credit (external liquidity) during the peak

of the financial crisis. To our knowledge, ours is the first paper to jointly examine all of these items with a European focus, and we analyze both public and private firms.<sup>1</sup>

Three contemporaneous survey-based papers study lines of credit. Lins et al. (2010) use data collected from 29 countries in the summer 2005 and provide an international perspective on how firms use lines of credit and cash holdings. One of the main findings in their paper is that lines of credit provide the flexibility that firms need to exploit future investment opportunities. However, they do not have access to data from a crisis period. Campello, Graham, and Harvey (2010) (CGH (2010), henceforth) consider the crisis period, but they ignore interactions between lines of credit and firm internal liquidity. Finally, Campello, Giambona, Graham, and Harvey (2010) (CGGH (2010), henceforth) conduct analysis similar to ours but their focus is on U.S. firms.

To characterize the role played by lines of credit during the crisis, we first present basic statistics showing that the use of those facilities is widespread in the Europe, though there is some identifiable industry variation. We find also variation when we break down the use of lines of credit. Firms that are private and have below investment-grade ratings have significantly higher lines-to-asset ratios relative to public and investment-grade firms. Interestingly, the overall availability of credit lines across those firm-types does not seem to change much during the crisis. What is more striking is the rate with which firms draw down funds from their lines of credit during the crisis. Firms that are small, private, junk-rated, credit-limited, and less profitable have drawn, on average, between 48% and 68% of their available lines of credit, while their counterparts (large, public, investment-grade, easy-credit, profitable) have drawn *only* between 30% and 44% of the funds available.

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<sup>1</sup>Sufi (2009), Lockhart (2009), and Yun (2009) also look at drawdowns, however, their samples are limited to public U.S. corporations. Moreover, these papers do not have information of the pricing of credit lines. Finally, their data do not encompass a credit crisis.

We also study how credit facilities interact with internal liquidity (cash holdings and cash flows). We document a positive relation between credit lines and cash flows, consistent with Sufi's (2009) finding that more profitable firms have more access to these facilities. Cash holdings, in contrast, are negatively related to credit lines, suggesting a substitution between credit lines and cash holdings once other factors --- firm characteristics such as size and growth opportunities --- are controlled for. We also find that the availability of cash flows and cash holdings reduce *drawdown* activities. These results are interesting because they confirm our inferences about the substitution between internal and external liquidity during the crisis.

Next, we study the pricing of lines of credit and its implications for the substitution between the different sources of internal and external liquidity. To this end, in the second quarter of 2009 we conducted another survey with the intent of obtaining pricing data for lines of credit. We find that during the crisis commitment fees increased by only 2 basis points on average in Europe relative to 14 bps for the U.S., interest rate markups increased by 28 basis points, and line maturity declined by 3.7 months. Our evidence also suggests that firms are less likely to pay a commitment fee if internal liquidity is available.

Finally, we investigate how access to cash holdings and lines of credit affect real-side activities. Surprisingly, this relation has not been explored in the literature until very recently (i.e., CGGH (2010)).<sup>2</sup> In this analysis, we regress capital investment on cash holdings, lines of credits, and an interaction term between these two sources of liquidity. These regressions contain a number of controls, including proxies for firm size, ownership type, credit ratings, financial constraint status, growth prospects, and industry dummies. Because we have information on cash and credit lines prior to the crisis, we can use that information as instruments in our estimations.

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<sup>2</sup> Sufi's (2009) study, for example, looks at the interactions between lines of credit and cash flow, but does not explore the real-side implications of lines of credit.

These instrumental-variables regressions help alleviate concerns about empirical biases. Admittedly, however, as in any empirical analysis, we cannot rule out the possibility that omitted variables affect our findings.

Our evidence suggests that access to lines of credit significantly boost investment plans during the crisis, but mainly for firms with large cash holdings. In particular, firms with cash holdings at the ninth decile of the sample distribution are able to increase planned investment on average by 2.8% if lines of credit shift from the 25<sup>th</sup> – 75<sup>th</sup> percentile of the sample distribution. On the other hand, firms without lines of credit cut investment in order to increase their cash savings. In all, these findings suggest that pre-committed lines of credit might have ameliorated the negative impact of scarce credit on real activities in a period when the average firm is planning to cut investment by 11%.

The remainder of the paper is organized as follows. The next section provides a review of the literature and the priors motivating our analysis. We describe the survey data in Section 3. Section 4 describes how firms manage different sources of internal liquidity (cash holdings and cash flows) as well as "options" on external liquidity (lines of credit). Section 5 examines the interaction between liquidity and real activities including investment and employment. Section 6 concludes.

## **2. Cash and Lines of Credit as Sources of Liquidity**

In this section, we provide a brief review of the theory motivating our analysis of corporate liquidity management. We also discuss the related empirical literature.

### **2. 1. Theory**

A central theme motivating a firm's demand for liquid assets is that those assets provide insurance against states in which the firm does not have sufficient funds to pay its contractual obligations (pay financiers, employees, suppliers) or invest in positive NPV projects. The insurance idea is behind theories dealing with the motivations for cash savings (e.g., Kim et al. (1998), Almeida et al. (2004), and Acharya et al. (2007)) and theories explaining the optimality of credit lines (Boot et al. (1987), Holmstrom and Tirole (1998), and Thakor (1995)).

Theories looking at the role of cash in providing for liquidity insurance have largely discussed its role in transferring funds across time (Almeida et al. (2004)) or across states of the world (Acharya et al. (2007)). In these models, the company tries to maximize value derived from the investment process under a financing friction that arises exogenously. Under a number of scenarios, holding the most liquid asset (cash) insures the firm against external financial constraints in virtually all states.

Credit line models propose a similar motivation: firms obtain committed credit lines as insurance against states in which spot-market financing would lead to inefficient outcomes (such as termination of valuable projects). In essence, lines of credit work as "options on liquidity" that can be strategically exercised.

Boot et al. (1987) are among the first to formalize this idea. They consider an asymmetric information set up where the firm suffers a liquidity shock. Since credit will be expensive in bad states of the world it makes sense for the firm to seek the insurance provided by a credit line. The facility works like a put option for the borrower, if the spot-market interest rates are high, the borrower can use the line and borrow at the pre-arranged low rate. To compensate for the loss, the bank charges an ex-ante commitment fee.<sup>3</sup>

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<sup>3</sup> Many other insurance-like characterizations can be found in the literature. Maksimovic (1990) provides a rationale based on product market competition, where a credit line allows the firm to expand when an investment opportunity

The most natural scenario under which firms will exercise (*en masse*) the liquidity option embedded in their credit lines occurs when there is an aggregate credit contraction.<sup>4</sup> This situation is modeled in Thakor (2005), who proposes a theory in which firms use their credit lines to secure liquidity during contractions, relying more on their own cash flows during favorable economic conditions. Thakor's theory points to concerns about overlending in good times since covenants are less likely to bind and firms may engage in inefficient investment. Based on the idea that credit lines provide for committed lending in the private sector, Holmstrom and Tirole (1998) also discuss aggregate implications for the insurance-like feature.

Despite the similarities among the literatures on cash holdings and lines of credit, there is no unifying theory considering these two sources of funding.<sup>5</sup> Both sets of theories, however, emphasize the importance of liquidity under contingencies in which the organized markets may fail. From a theoretical standpoint, one should examine the relative importance of these two views on corporate liquidity management at times when firms face a negative shock to the supply of external financing. To our knowledge, our paper is the first to do this empirically.

## **2. 2. Empirical Evidence**

A large empirical literature on cash holdings has emerged in recent years. A partial list of papers includes Kim et al. (1998), Opler et al. (1999), Pinkowitz and Williamson (2001), Mikkelsen and Partch (2003), Almeida et al. (2004), Faulkender and Wang (2006), and Haushalter et al. (2007). Bates et al. (2009) provide a useful review of this literature.

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arises, and this commitment threatens industry rivals. Berkovitch and Greenbaum (1991) propose a model in which lines of credit provide insurance against variations in required investment.

<sup>4</sup> Evidence in Ivashina and Scharfstein (2010), CGH (2010), and Montoriol-Garriga and Sekeris (2009) suggests that firms began to draw heavily on their existing lines of credit during the crisis (to such an extent that these activities began to "crowd out" the supply of new loans in the economy).

<sup>5</sup> However, Boot et al. (1987) argue that a firm might be better off with a credit line than with cash. The reason is that cash reduces inefficiencies equally across all states, while the credit line is effective when interest rates are high.

In contrast to the literature on cash holdings, the literature on lines of credit is scant. Ham and Melnik (1987) study credit line usage (drawdowns). Examining a sample of 90 non-financial corporations, they find that drawdowns are positively related to total sales and negatively related to interest rate costs (risk premium plus commitment fee). Looking at Spanish firms, Jimenez et al. (2007) find a negative relation between cash flows and drawdowns. Agarwal et al. (2004) use a proprietary dataset of lines extended by a single bank to small, privately held firms in the five U.S. markets. They find that firms with higher profits establish fewer credit lines, but they have inconclusive results for drawdowns. Agarwal et al. (2006) find empirically that borrowers with higher expectations of future credit quality deterioration originate credit lines to preserve financial flexibility. Melnik and Plaut (1986) and Shockley and Thakor (1997) provide empirical evidence that lines of credit are used as liquidity insurance and show how prices are determined from a contract design viewpoint.<sup>6</sup>

Starting with Sufi (2009), a number of papers have focused on the covenants attached to credit lines and their implications for corporate liquidity management. Using a sample of 300 public firms, Sufi finds that credit line access and usage is influenced by profitability. More specifically, he finds that high cash flow increases the chance that the firm has a line of credit and boosts the relative importance of lines of credit for total liquidity (credit lines plus cash). Sufi also examines whether the firm has violated covenants, and finds that low cash flow is a strong predictor of violations. Nini et al. (2007) document the existence of explicit credit line restrictions on capital expenditures. In general, poor performance triggers covenant violations, which in turn trigger larger renegotiation processes that eventually change the terms of the original loan (see also Chava and Roberts (2007)).

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<sup>6</sup> Shockley and Thakor (1997) study the determinants of prices charged for credit lines (i.e., rates and fees). Firms that are smaller, have lower Q, and are poorly-rated are more likely to be charged high usage fees.

Other papers focus on the feedback effects between macroeconomic aggregates (such as monetary policy) and lines of credit. Morgan (1998) gathers credit line data from bank surveys and finds that loans based on existing credit lines increase after a policy tightening, but that origination of new term loans slows. Saldenber and Strahan (1999) find that firms drew upon their bank lines when access to the commercial paper market was limited in 1998. Ivashina and Scharfstein (2010) find that many of the drawdowns observed in the current credit crisis were undertaken by low credit quality firms. Their inferences find support in CGH (2010) and CGGH (2010).

Papers considering aggregate credit conditions and corporate liquidity point to an interesting (yet unexplored) line of research in corporate finance: the effect of macroeconomic conditions on firms' liquidity management choices (namely, the use of cash and lines of credit) and their ultimate impact on real corporate decisions. Our study uses the current financial crisis to shed some light on this dynamic.

The paper that is closest to ours is Sufi (2009). However, the two papers differ in a number of important aspects. First, Sufi looks at the interaction between cash and lines of credits in "normal times," when external financing is generally not a binding constraint. The limitation of this approach is that cash and credit lines might not be particularly important for firms during those times, let alone the interaction between them. A second issue is that Sufi's data are restricted to public firms --- firms that are larger and likely to have access to alternative forms of liquidity management (such as off-balance sheet derivatives). Third, we substantiate our findings by looking at credit line pricing, while Sufi's data do not contain price information. Fourth, our focus is on European firms. Finally, a crucial difference is that our paper looks at real economic outcomes. From a policy perspective, firms' choices between liquidity instruments (cash and

lines of credit) are most relevant to the extent that firms' real-side decisions are affected (or even distorted). We thus push credit facility research in a number of important new directions.

### **3. Data**

We obtain our data by surveying via e-mail 10,500 CFOs who are subscribers of the CFO magazine in the midst of the financial crisis of 2008 – 2009. Our sample of respondents includes 561 CFOs from 21 countries in both Europe and North America. Our analysis is based on the European sample, but we compare these results with the U.S. evidence when it is helpful to give context to the European evidence.

Our premise is that a test of theories dealing with firm's choice of liquidity tools such as cash holdings and lines of credit should have more power when access to liquidity becomes particularly important (during a credit squeeze). We ask CFOs about their holdings of cash, their access to bank credit lines, their use of available lines (drawdown decisions), the cost of those credit facilities, and their pro-forma plans about investment, technology, and employment expenditures. As discussed, rather than using an approach that collects archival data on firm observed outcomes, we study firms' *planned* policies to learn about the relation between liquidity and real decisions. Because we ask decision-makers directly about their plans during the crisis --- rather than looking at ex-post outcomes potentially contaminated by factors outside of the decision-maker information set --- we get closer to establishing causal relations between credit shocks and corporate decision-making.

The main limitation of our survey approach is that we can only rely on one cross-section of firms. Therefore, it is not possible to control for unobserved firm-fixed effects using a within estimator. However, we do have access to lagged values for some of the key variables used in

this study, including cash holdings and lines of credit, which we use in instrumental variable regressions. In addition, because respondents to the survey remain anonymous, we are unable to directly link our sample to other databases.

Readers should also be aware of limitations that apply generally to all survey studies, including the possibility that respondents might have misunderstood some of the questions in the survey. We did consult with experts to refine the survey questions. However, it is not possible to exclude completely some concerns with questions interpretation.

### **3.1. Descriptive Statistics**

Table 1 presents descriptive statistics for the European sample during the financial crisis. The table includes information on lines of credit and other liquidity variables, such as cash holdings and cash flow, firm characteristics, such as size or listing in a public exchange, and real activities, including CFOs planned percentage changes over the next 12 months in investment, technology spending and employment. On average, firms plan to cut investments by about 11% in Europe. This is about 5 times as much the cut planned for technology spending. By comparison, in the U.S. the planned cuts in investment is 15%.

Table 1 also shows evidence of the widespread use of lines of credit by European firms. On average, lines of credit represent about 27% of total assets, compared to about 14% for cash holdings and 12% for cash flows. The averages reported in Table 1 seem to imply that lines of credit have not noticeably changed during the financial crisis, but further data breakdowns reported below give context to these aggregate numbers. In the U.S., lines of credit represent 24% of total assets, while cash holdings represent 12% of assets.

Notably, Table 1 also shows that only 41% of firms in our European sample are publicly listed (the rates are lower in the U.S.). This is a unique feature of our data relative to other corporate finance studies, which usually rely on public firm data. About one-in-three of our firms have revenues higher than \$1 billion and have an investment-grade rating for their public debt.

Table 1 About Here

Evidence in Table 2 shows considerable cross-country variation in the proportion of firms with access to lines of credit. For example, 92% of Dutch firms in our sample have a line of credit versus only 32% of UK firms. Lines of credit as a percentage of total assets are also low in the UK relative to France, Germany and the Netherlands. Notably, UK firms do not generally have larger cash holdings relative to firms with more access to lines of credit.

Table 2 About Here

Table 3 shows that there is significant cross-industry variation in the proportion of companies with a line of credit. In Europe, this proportion ranges from 29% of biotech firms with a line of credit to 100% for transportation. The table also points to the possibility of a broad substitution effect between lines of credit and cash savings across industries. For instance, 14% of healthcare firms' assets are composed by cash, compared to only 2.5% for firms in the transportation industry. We return to these issues in the firm-level tests in Section 4.

Table 3 About Here

#### **4. Cash Holdings, Cash Flows, and Credit Lines**

We start our liquidity analysis by comparing our results with the evidence in Sufi (2009). We note that Sufi's inferences are limited to those that one can obtain by studying public, relatively larger firms. For these firms, cash and lines of credit need not to be primary sources of liquidity

(see Table 3), and therefore they need not to interact. In particular, his analysis may miss the dynamics of the interaction between internal liquidity and lines of credit for bank-dependent firms, precisely the kind of firm for which lines of credit lines matter the most. Moreover, Sufi's analysis uses data from a period when credit standards and the cost of capital in the U.S. were at historical lows (1996 to 2003). These are important issues. From a policy standpoint, for example, one wants to understand the role played by lines of credit when these facilities matter the most (credit contractions) and for the firms that are most affected by them (bank borrowers).

Our tests address each of the issues. First, we look at liquidity management in the midst of a credit crunch. Second, we have data from both public and private firms. Third, we adopt a flexible modeling approach, one that explicitly allows for rich interactions between the elements of interest: cash holdings, cash flows, outstanding lines of credit (alternatively, drawdowns). Fourth, we corroborate our findings looking at data from the U.S. and also extend our analysis to the credit line pricing.

#### **4.1. Cash Holdings and Lines of Credit: Univariate Analysis on Access and Usage**

We start our analysis by reporting in Table 4 mean comparison tests for cash holdings, lines of credit, and drawdowns. We define firms as "small," "private," "non-investment grade," "credit-limited," and "negative cash flow" if, respectively, their sales are less than \$1 billion, they are privately held, their bonds are unrated or rated below investment grade (BBB-), they rate themselves in the bottom 3 deciles for access to external funds during the crisis,<sup>7</sup> and they reported a negative cash flow in the fiscal year 2008. To shorten the exposition, we denote these firms generally as "limited-credit category." We call the counterparts of the firm types just

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<sup>7</sup> Managers rate (on a 0 to 100 scale) their access to external funds. Summary information is shown in Table 1.

described, respectively, as "large," "public," "investment grade," "easy-credit," and "positive cash flow" types. When convenient, we denote these firms collectively as "easy-credit category."

#### Table 4 About Here

Panel A of Table 4 indicates that during the first quarter of 2009 there was no significant decline in the lines-to-asset ratio for our sample firms, relative to the previous year. However, we show later that pricing and other terms of those facilities, including maturity and collateral requirements, have changed significantly during the crisis.

Panel A indicates that lines of credit vary significantly across different firm types. In particular, firms in the "limited-credit category" (with the exception of unprofitable firms) all establish large lines of credit both before and during the crisis. These firms are most likely to be affected by negative shocks to the economy (Gertler and Gilchrist (1993) and most likely to rely on credit lines as a result (Ivashina and Scharfstein (2010) and CGH (2010)).

Panel B of Table 4 focuses on cash holdings. The evidence shows that cash holdings generally decline during the crisis period especially for firms in the "limited-credit category". The drop in cash savings following the crisis is quite large among firms that have limited access to credit or have negative cash flows. These firms have, on average, a drop in cash savings of around 3-4% during the crisis period. This change is economically significant relative to the sample average cash holdings of 14%.

Panel C of Table 4 focuses on access to lines of credit and drawdowns. Column 1 shows that the proportion of firms with access to a credit line facility is generally larger among firms in the "easy-credit category". These differences are statistically significant for the size partition using a two-tail proportional difference test. Recall that Panel A reports that the average line of credit facility is usually larger for firms in the "limited-credit category". The evidence in Panels

A and C together suggest that firms in the “easy credit category” are more likely to have access to credit facilities, but their lines of credit are generally proportionally smaller compared to their constrained counterparts.

Column 2 of Panel C reports the proportion of firms that have experienced difficulties in initiating or renewing a line of credit. We find that 30% of "credit-limited" firms have difficulties obtaining or maintaining a line of credit during the financial crisis, compared to only 4% of "easy-credit" firms. The pattern is less clear across other different credit constraints categories. We return to this issue later when we discuss Table 5, which assesses in a multivariate framework how firm characteristics determine the probability of facing difficulties in initiating or renewing a credit line. Perhaps not surprisingly, column 3 shows that “limited credit category” firms are generally more likely to rely on their lines of credit during the crisis, probably in anticipation of being denied the renewal of a line of credit in the future (cf. CGH (2010)). Column 4 shows that they also draw down significantly more relative to their “easy credit category” counterparts. For instance, the average small firm draws down 53% of its credit facilities compared to only 30% on average for the large firm partition. Credit-limited firms and firms with negative profits draw down 69% and 64% of their credit line maximums, respectively.

#### **4.2. The Interaction between Cash Holdings and Lines of Credit: Regression Analysis**

In this section, we rely on regression analysis to study the interaction effects between lines of credit and internal liquidity. Using a regression framework, we are also able to control for the effect of firm heterogeneity.

The main results of this section are presented in Table 5. Columns 1-2 display models for lines of credit, respectively for Europe and the U.S. Columns 3-4 replicate the same regressions

using drawdowns as dependent variable. The results in columns 1 and 2 are similar to those in Table 3 of Sufi (2009). Sufi's recent work has contributed to our understanding of demand for credit lines, and we use it as a natural benchmark for our analysis. Similar to Sufi, we regress lines of credit on cash flow and several controls for firm characteristics including, long-term investment prospects, size, credit ratings, and ease of access to credit. However, our empirical design also allows for nonlinearities in the way cash flows and cash holdings interact in explaining lines of credit. In particular, the model allows us to investigate whether, at higher levels of cash, firms rely less on lines of credit even if their cash flows would allow them greater access to credit facilities. Identifying this effect is one of our main goals: to shed light on the use of credit lines during the crisis as a function of internal funds. To this end, we explicitly include cash holdings as well as its interaction with cash flows as independent regressors. Following previous notation, the line of credit model can be written as follows:

$$\frac{LC}{Assets}_i = c + \alpha_1 CashFlow_i + \alpha_2 CashHoldings_i + \alpha_3 (CashFlow \times CashHoldings)_i + \gamma X_i + \varepsilon_i \quad (1)$$

where  $\mathbf{X}$  is a matrix containing proxies for investment growth prospects, size, ownership form, credit quality, and access to external credit discussed above. These variables are included to minimize concerns with uncontrolled heterogeneity. All of our regressions are estimated with heteroskedasticity-consistent errors clustered by industry (Rogers (1993)).

#### Table 5 About Here

Consistent with Sufi (2009), columns 1-2 show that cash flows have a positive effect on the magnitude of lines of credit that a firm has available. The negative coefficient for cash holdings confirms our intuition that firms trade off cash holdings with lines of credit. This negative relation also highlights the need to include an explicit proxy for cash holdings in line of credit analysis. The interaction between cash holdings and cash flows delivers an even more

interesting insight, but it is statistically significant only for the U.S. sample. Focusing on the U.S. case, the evidence for the interaction term indicates that for firms with no cash a one-interquartile range (IQR) change in cash flows ( $=0.12$ ) is associated with an increase of about 4% in the firm's ratio of credit lines-to-total assets. This effect is significantly mitigated for cash-rich firms. For example, for firms with cash holdings at the ninth decile ( $=0.30$ ) of the sample distribution, a one-IQR change in cash flows increases the use of credit lines by just over 2% and is statistically insignificant.

Though we just interpreted our results in terms of changes in cash on lines of credit, one could also interpret the results the other way; that is, as indicating that, regardless of their profitability, firms will save cash in the crisis if they lack access to lines of credit. To mitigate concerns with the direction of causality in columns 3-4 of Table 5 we use drawdowns as dependent variable. Our evidence shows that firms with more cash flows and cash holdings draw down less from their lines of credit suggesting a substitution effect between internal and external liquidity during the crisis period. However, the interaction effect between cash flows and cash holdings is not statistically significant.

Our empirical findings are consistent with the view that firms consider lines of credit as an insurance against liquidity shocks to be used during exceptional times. In particular, our tests show that these credit facilities are largely used when firms run out of internal liquidity. Our tests are performed during a credit contraction and suggest that lines of credit become particularly important when firms have low savings and are unprofitable. Our baseline findings, which are based on European data, are supported by evidence from the U.S.

#### **4.3. Initiating and Renewing a Credit Line during the Crisis**

One limitation of our credit line regressions is that some of those credit facilities were pre-arranged and the quantities that we observe may not respond to changes in cash flows and cash holdings, but rather covary with them for other reasons. These concerns are minimized by the drawdown regressions, but as discussed next we also gather evidence on firm's *access* to lines of credit during the crisis.

Our survey asks managers whether they have recently had difficulty initiating or renewing a credit line. Presumably, internal liquidity (cash holdings) and operating performance (cash flows) should minimize difficulties in raising credit lines. This is the premise of the conclusions we draw from the lines of credit regressions in the last section. In particular, we say that firms with high internal funds (cash holdings and cash flows) seem to demand fewer credit lines, even though these firms could probably establish more lines if they wanted. We now check from another angle whether this is indeed the case.

We report probit regression results for the European sample in Table 6. The dependent variable in the regressions is a dummy variable assuming a value of 1 if the firm reported difficulties in initiating/renewing a line of credit and zero otherwise.<sup>8</sup> The independent variables are the same as those in the credit line regressions of the previous section and yield expected results. For example, easy-credit firms are less likely to face difficulties in obtaining or maintaining lines of credit. More importantly, we find that the availability of cash flows and cash holdings reduce the likelihood that a firm will face difficulty in initiating/renewing a line of credit during the financial crisis. These results agree with the logic of our inferences about the relation between internal and external liquidity during the current crisis.

Table 6 About Here

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<sup>8</sup> We discard firms that do not respond to this question, but our results do not change if we assign missing values to 0.

#### **4.4. Commitment Fees and Interest Markups for Lines of Credit**

The discussion above shows that firms draw down credit lines less intensively when internal liquidity is high. This suggests that there may be a cost wedge between internal funds and lines of credit. In this section, we try to understand the pricing structure of lines of credit with an emphasis on the effect of internal funds both before and during the crisis.

With this purpose in mind, in the second quarter of 2009 we surveyed 600 CFOs from Europe and North America to collect pricing information on credit lines. The new survey includes information on basis point commitment fees that firms pay to maintain the availability of credit lines, markup interest rates on LIBOR/Prime rate on drawdowns,<sup>9</sup> credit line maturity, and collateral requirements.

Table 7 provides descriptive statistics on credit line pricing both before and during the financial crisis. For Europe, we document an increase of 2 basis points in the commitment fee during the crisis. The increase is much more pronounced in the U.S. However, we find that the markup on LIBOR/Prime Rate has increased sharply in both continents. For the U.S., the markup increased by about 64 basis points during the financial crisis. This average increase is 28 basis points in Europe. Finally, Table 6 shows that lines of credit tenor has generally decreased during the financial crisis by about 3.7 months in Europe and by 2.6 months in the U.S. To put these numbers in context, note that the average maturity of outstanding lines of credit in these markets prior to the crisis was about 30 months.

While the data are limited, we gain some insight about the workings of the credit line market during the financial crisis. While nominal value of lines of credit outstanding remained relatively unchanged (as a proportion of firm assets), drawdowns from outstanding lines of credit

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<sup>9</sup> Most firms report basis point markups for their lines of credit on both LIBOR and Prime rates.

were very high during the crisis period (see Table 4). As we have just documented, the terms associated with those facilities worsened from the perspective of borrowers (higher fees/interest markups and lower maturities) in the crisis. Arguably, the crisis enabled banks to set higher prices for new lines and renegotiate the terms of existing ones.

Table 7 About Here

Next, we analyze the relation between lines of credit pricing and internal liquidity (cash flows and cash holdings) in a regression framework. This analysis is motivated in part by the work of Shockley and Thakor (1997), who show that the commitment fee structure can be used as a device to separate firms according to their quality. In particular, they argue that banks will not charge a commitment fee to well-known, high quality firms because information asymmetry is small in this case. For lower quality firms, whose assets and growth prospects are more difficult to evaluate, one should expect the bank to charge a commitment fee.

The results are reported in Table 8. Following Shockley and Thakor (1997), in columns 1, we use a probit specification where we regress an indicator that equals 1 if a firm pays a commitment fee on its current credit lines (and zero otherwise) on firm attributes for quality such as size, ownership type, ratings, credit constraints, growth prospects, as well as controls for the size of the credit line, its maturity, and the use of collateral. In columns 2 to 5, we augment Shockley and Thakor's specification by including cash flows, cash holdings, and an interaction term for those two internal liquidity variables.

Table 8 About Here

Focusing on the results reported in column 4, we note that the internal liquidity variables enter the commitment fee regressions with the expected negative sign. In particular, the evidence suggests that firms with high cash flows and cash holdings are less likely to pay a commitment

fee. Economically, a one-IQR increase in cash flow leads to a decline in the probability of paying a commitment fee of about 10.4%. Likewise, a one-IQR increase in cash decreases this probability by about 11.9%.

## 5. Corporate Liquidity and Real Corporate Policies

The role of liquidity for real activities has only recently received attention in the literature (cf. CGGH (2010), who focus however on a U.S. sample). In this section, we assess the effect of liquidity management (internal liquidity and “options” on external liquidity) on ex-ante investment plans for our European sample in the midst of the financial crisis, when external credit “suddenly” became scarce.

We regress the CFO’s pro-forma planned percentage changes in capital expenditures on cash holdings, lines of credit, and their interaction. We control for heterogeneity by including indicators for firm size, ownership type, credit ratings, and financing constraints. We estimate each investment regression using OLS, but repeat each estimation using a two-step GMM method to mitigate concerns with endogeneity. The GMM estimator yields standard errors that are robust to heteroskedasticity and clustering at the industry level. Our regression specification assumes the following form:

$$CapitalExpenditure_i = c + \alpha_1 CashFlow_i + \alpha_2 LCs_i + \alpha_3 (CashFlow \times LCs)_i + \gamma X + \varepsilon_i \quad (2)$$

where the dependent variable is the firm's planned capital expenditures expressed in percentage changes over the next 12 months relative the last 12 months.

In our IV analysis, we use as instruments lagged cash holdings, lines of credit, their interaction, and the interaction of their predicted values to instrument three endogenous variables

(namely cash holdings, lines of credit, and their interaction term).<sup>10</sup> Accordingly, we use four overidentifying restrictions.

The regression results are reported in Table 9. We start by noticing that the economic meaning of the reported coefficients needs to account for the interactive structure of the equations. Our estimates suggest that access to external liquidity (lines of credit) significantly affects corporate investments for firms with large cash reserves. Focusing on the IV results for Europe (column 2), our findings suggest that a one-IQR increase in lines of credit (=0.30) at the ninth decile of cash (=0.31) leads firms to increase investment by 2.8% over the next year. Recall, these are times of large spending cuts and our estimates suggest that lines of credit may provide the "edge" firms may need to invest, provided they have internal funds that can be used for other needs or obligations. Since those lines of credit were pre-committed (arranged prior to the crisis), our findings support the notion that lines of credit contribute to corporate investment in the financial crisis.

Table 9 About Here

Diagnostic statistics for the IV analysis are reported at the bottom of Table 9. The  $p$ -values for the Hansen  $J$ -test of overidentifying restrictions indicate that we never reject the joint null hypothesis that our instruments are uncorrelated with the error term in the investment regressions and the model is properly specified. Furthermore, the low  $p$ -values associated with the first stage  $F$ -test of excluded instruments confirm that our instruments are relevant in explaining the variation of our endogenous variables.

To sum up, our evidence points to an important role for internal and external liquidity in driving planned spending (investment, technology, and employment) during the current financial

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<sup>10</sup> Wooldridge (2002) explains that one can use the interaction of the predicted values from the first stage regressions as an additional instrument in this case. Therefore, we include the interaction of the predicted values of cash holdings and lines of credit as an additional instrument.

crisis. Noteworthy, our tests highlight novel, important interaction effects between these two sources of liquidity. At relatively lower levels of internal liquidity (represented by cash holdings), investment does not benefit from the firm's access to external liquidity (lines of credit). This suggests that such funds might be used for other purposes. At higher levels of internal liquidity, however, access to external funds seem to contribute to investment spending in a significant way during the financial crisis.

## **6. Conclusions**

During the financial crisis of 2008-9 credit suddenly became scarce in the international financial markets. We use this “shock” in the market for credit to study how firms manage internal and external liquidity and on how the interaction between the different sources of liquidity facilitates corporate investment and other real-side activities.

Our data come from two surveys in early 2009, each representing approximately 600 CFOs from Europe and North America. We find that the average size of the available lines of credit did not change much during the crisis. We observe, however, significant variation in the use of credit lines across companies. Firms that are small, private, and speculative rely more on lines of credit, before and during the crisis, than their less “limited-credit category” counterparts (large, public, and investment grade). We also find that “limited-credit category” firms draw more heavily on their credit lines at the same time that they are more likely to face difficulties in renewing or initiating lines of credit during the crisis.

We also study how credit facilities relate to internal liquidity. We find that a positive shock to cash flows has a direct positive effect on access to lines of credit. However, this effect is significantly mitigated at high levels of cash holdings. Our tests imply that the option to access

liquidity from lines of credit becomes less valuable when internal liquidity is abundant (even accounting for the fact that more profitable, liquid firms should find it easier to establish credit lines).

Our results suggest that firms reduce their use of lines of credit when internal liquidity is available, consistent with a cost wedge between these two forms of liquidity. We therefore study the pricing structure of lines of credit before and during the crisis. For Europe, we find that during the crisis lines of credit commitment fees have increased on average by 2 basis points, markups over LIBOR/Prime rate have increased by 28 basis points, and the average credit line maturity has declined by 3.7 months (down from 30 months on average). Our tests show that these changes are sharper for U.S. firms. We also find that firms with more internal liquidity are less likely to pay a commitment fee.

Our findings conform to the view that while the quantity of outstanding lines of credit may have stayed relatively unchanged during the crisis, the terms of those facilities (especially prices) have changed in ways consistent with a decline in the supply of credit lines and an increase in the demand for those facilities. These inferences are tentative, however. Our sample is essentially limited to a snapshot of the aggregate data. Accordingly, in our analysis, we focus largely on cross-sectional characterizations related to the use of lines of credit and the pricing of those facilities.

Finally, we examine how liquidity interacts with managerial plans concerning capital investing. We find that firms seem to substitute cash savings for investments at low levels of lines of credit. However, access to lines of credit significantly boosts investments for firms with large cash holdings. Our estimates imply that lines of credit may provide the "edge" firms may need to invest in the crisis, provided they have internal funds also available.

In all, our study uncovers important aspects of the role of credit lines as "options on liquidity" when financial markets fail. We find that the current crisis has not severely hindered ability to access lines of credit and draw down existing facilities. This has proven to be crucial since lines of credit are an important instrument in easing the impact of the financial crisis on corporate investment. Our findings provide context to observed policy efforts to coordinate policies that help financial intermediaries around the world.

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**Table 1 – Summary Statistics**

This table reports summary statistics for the main variables. The data are from the CFO survey of the European sample, first quarter of 2009. The sample includes all firms except, financial, governmental, and nonprofit organizations. Planned Investments, Planned Technology and Planned Employment are expected percentage changes in these variables by the CFO over the next 12 months. Cash Holdings is the ratio of cash holdings and marketable securities total assets in percentage terms. LCs are bank lines of credit as a percentage of total assets. Investment Growth Prospects is the rating of the firm’s growth opportunities provided by the CFO, ranging from 0 (no growth opportunities) to 100 (excellent growth opportunities). Cash Flow is return on assets in the year 2008 in percentage terms. Large is a dummy variable taking a value of 1 if the firm’s sales revenue are equal to or more than \$1 billion, and zero otherwise. Investment Grade is a dummy variable that takes a value of 1 if the firm has a rating of BBB- or higher, and zero otherwise. Public Firm is a dummy variable taking a value of 1 if the firm is publicly listed and zero otherwise. Drawdown is the percentage of credit drawn from total credit line. Access to Credit is the CFO’s reported score of the firm ability to raise external funds during the crisis, ranging from zero (no access to external funds) to 100 (unlimited access to external funds).

Variables	Descriptive Statistics					
	Mean	St. Dev.	25th Pct.	50th Pct.	75th Pct.	Obs.
Planned Investments	-11.23	42.46	-25.00	-10.00	0.00	120
Planned Tech Spending	-1.73	54.04	-10.00	0.00	1.00	101
Planned Employment	-6.43	15.50	-10.00	-5.00	0.00	127
Cash Holdings (2009Q1)	14.19	17.65	2.80	8.00	20.00	148
Cash Holdings (2008Q1)	15.28	18.93	4.00	10.00	20.00	146
LCs (2009Q1)	27.03	24.94	10.00	20.00	40.00	105
LCs (2008Q1)	26.47	23.22	10.00	20.00	40.00	103
Investment Growth Prospects	63.86	23.56	50.00	70.00	80.00	181
Cash Flow	11.89	16.20	5.00	10.00	18.00	146
Large	0.31	0.46	0.00	0.00	1.00	183
Investment Grade	0.28	0.45	0.00	0.00	1.00	183
Public Firm	0.41	0.49	0.00	0.00	1.00	183
Drawdowns	44.23	34.19	10.00	50.00	75.00	91
Access to Credit	57.85	27.76	42.50	60.00	80.00	172

**Table 2 – Lines of Credit and Cash Holdings by Country**

This table reports the number of observations by country of headquarters. The table also reports the percentage of firms with available lines of credit as well as lines of credit and cash holdings as a percentage of total assets before and during the crisis. The data are from the CFO survey of the European sample, first quarter of 2009. The sample includes all firms except, financial, governmental, and nonprofit organizations.

	Obs.	Proportion of Firms w/ LC	Avg. LC/A During Crisis	Avg. LC/A Before Crisis	Avg. Cash/A During Crisis	Avg. Cash/A Before Crisis
<b>Country</b>						
Austria	7	83.33	21.75	27.50	15.75	16.25
Belgium	9	66.67	47.00	29.33	7.50	12.75
Denmark	8	85.71	37.80	36.00	9.43	9.83
Finland	9	55.56	16.80	17.60	19.50	19.38
France	23	72.22	27.50	25.63	14.80	19.29
Germany	13	50.00	26.80	25.00	8.11	8.56
Greece	6	100.00	49.30	41.40	23.15	24.95
Italy	5	33.33	31.00	38.50	17.50	20.00
Luxembourg	3	100.00	41.67	38.33	2.50	2.50
Netherlands	14	91.67	35.08	33.58	11.33	11.42
Portugal	9	87.50	27.63	27.86	5.50	5.00
Russia	5	60.00	27.67	30.00	12.75	8.20
Spain	8	85.71	22.00	27.83	11.50	16.50
Sweden	18	58.33	22.57	24.29	13.33	13.83
Switzerland	5	75.00	15.00	14.00	14.50	9.25
United Kingdom	26	31.58	12.02	16.17	15.82	18.06
Other	16	77.78	25.20	24.00	5.08	6.75

**Table 3 – Lines of Credit and Cash Holdings by Industry**

This table reports the percentage of firms with available lines of credit by industry. The table also reports lines of credit and cash holdings as a percentage of total assets before and during the crisis. The data are from the CFO survey of the European sample, first quarter of 2009. The sample includes all firms except, financial, governmental, and nonprofit organizations.

	Proportion of Firms w/ LC	Avg. LC/A During Crisis	Avg. LC/A Before Crisis	Avg. Cash/A During Crisis	Avg. Cash/A Before Crisis
<b>Industry</b>					
Retail/Wholesale	63.64	34.27	33.93	14.45	15.22
Manufacturing	80.33	26.59	24.69	11.77	13.15
Mining	90.00	14.00	16.50	7.65	8.25
Transportation	100.00	22.50	22.50	2.50	6.00
Communication	36.36	16.00	17.50	12.70	13.20
Software/Biotech	28.57	11.50	8.00	26.35	30.47
Services	52.38	20.51	21.70	21.35	22.63
Healthcare	64.29	26.86	28.86	14.30	12.00

**Table 4 – Lines of Credit by Firm Characteristics: Europe**

This table reports lines of credit (Panel A) and cash holdings (Panel B) as a percentage of total assets, conditional on firm characteristics, for European firms before and during the crisis. Panel C reports proportions of firms with lines of credit and drawdowns conditional on having access to a line of credit as well as average drawdowns by firm characteristics. The data are from the CFO survey of the European sample, first quarter of 2009. The sample includes all firms except, financial, governmental, and nonprofit organizations. Firms are defined as “Small” if their sales are less than \$1 billion, and “Large” otherwise. “Private” firms are those not listed in any stock exchange, while “Public” firms are listed in a stock exchange. “Non-Investment Grade” firms are unrated or have a credit rating of BB+ or below. “Investment Grade” firms are those with a credit rating BBB– or higher. “Credit-Limited” firms are those with a CFO’s reported score of the firm ability to raise external funds during the crisis in the bottom 3 deciles. “Easy-Credit” firms are those where the CFO has reported a score in the top 3 deciles.

Panel A: Lines of Credit	During Crisis	Before Crisis	Difference During – Before the Crisis
Small	28.22	27.65	0.57
Large	23.41	24.35	-0.95
Diff. Small – Large	4.82	3.30	
Private	29.91	29.44	0.47
Public	21.10	21.78	-0.68
Diff. Private – Public	8.81	7.67*	
Non-Investment Grade	28.93	29.86	-0.93
Investment Grade	21.32	19.27	2.05
Diff. Non-Inv. – Inv. Grade	7.61	10.58**	
Credit Limited	26.77	28.68	-1.91
Easy Credit	31.86	30.76	1.10
Diff. Limited – Easy	-5.08	-2.08	
Negative Cash Flow	17.35	18.70	-1.35
Positive Cash Flow	27.26	27.17	0.09
Diff. Negative – Positive Cash Flow	-9.91	-8.47	
Panel B: Cash Holdings	During Crisis	Before Crisis	Difference During – Before the Crisis
Small	16.47	17.75	-1.29*
Large	9.35	9.95	-0.60
Diff. Small – Large	7.12**	7.80**	
Private	17.29	18.91	-1.62**
Public	10.09	10.40	-0.31
Diff. Private – Public	7.20**	8.51***	
Non-Investment Grade	11.48	12.82	-1.34**
Investment Grade	20.21	20.74	-0.53
Diff. Non-Inv. – Inv. Grade	-8.73***	-7.92**	
Credit Limited	18.38	20.99	-2.62*
Easy Credit	15.88	16.21	-0.32
Diff. Limited – Easy	2.50	4.78	
Negative Cash Flow	6.07	10.23	-4.17
Positive Cash Flow	16.46	17.29	-0.83
Diff. Negative – Positive Cash Flow	-10.39	-7.06	

Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% (two-tail) test levels, respectively.

Panel C: LC Access and Drawdowns	Proportion of Firms w/ LCs > 0	Proportion of Firms w/ Difficulty in Renewing LCs	Proportion of Firms w/ Drawdowns > 0	Average Drawdowns (% of Maximum)
Small	0.59	0.11	0.86	53.18
Large	0.82	0.19	0.77	30.40
Diff. Small – Large	-0.23***	-0.08	0.09	22.78***
Private	0.67	0.12	0.84	48.04
Public	0.65	0.16	0.81	40.26
Diff. Private – Public	0.02	-0.04	0.03	7.78
Non-Investment Grade	0.66	0.12	0.85	49.22
Investment Grade	0.67	0.17	0.78	36.52
Diff. Non-Inv. – Inv. Grade	-0.01	-0.05	0.07	12.70*
Credit Limited	0.51	0.30	0.95	68.57
Easy Credit	0.62	0.04	0.78	39.83
Diff. Limited – Easy	-0.11	0.25***	0.18*	28.74***
Negative Cash Flow	0.60	0.19	0.89	63.56
Positive Cash Flow	0.65	0.13	0.83	44.14
Diff. Negative – Positive Cash Flow	-0.05	0.06	0.06	19.42*

Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% (two-tail) test levels, respectively.

**Table 5 – The Relation between Cash Holdings, Cash Flows, Lines of Credit, and Drawdowns: Regression Analysis**

This table reports results from credit line regressions using OLS. In columns 1 and 2, the dependent variable is the amount of lines of credit available as a percentage of total assets. In columns 3 and 4, the dependent variable is the percentage drawn down from available lines of credit. Regressions include a constant term (unreported). The data are from the CFO survey of the European and U.S. samples, first quarter of 2009. Independent variables' definitions are reported in Table 1. *t*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors adjusted for clustering across observations within industry.

	Dep. Var.: LC / Assets		Dep. Var.: Drawdowns /LC	
	Europe (1)	U.S. (2)	Europe (3)	U.S. (4)
Cash Flow	0.206*** (2.59)	0.325** (2.20)	-0.344*** (-2.63)	-0.571*** (-2.57)
Cash Holdings	-0.426*** (-7.74)	-0.161** (-2.43)	-0.610*** (-5.03)	-0.847*** (-3.77)
Cash Flow×Cash Holdings	-0.061 (-0.51)	-0.424** (-2.33)	-0.809 (-0.27)	0.644 (0.65)
Large	0.079*** (3.26)	0.075** (2.45)	-0.139 (-0.91)	-0.110*** (-2.67)
Public Firm	-0.147*** (-3.50)	-0.061** (-2.04)	-0.032 (-0.26)	-0.045 (-1.08)
Investment Grade	-0.047 (-1.14)	-0.077** (-2.10)	-0.150 (-1.51)	-0.070 (-1.14)
Easy Credit	-0.003 (-0.08)	-0.016 (-0.84)	-0.052 (-0.54)	-0.085** (-2.26)
Inv. Growth Prospects	0.061 (1.34)	-0.024 (-0.63)	-0.087 (-0.61)	-0.139 (-0.66)
Obs.	117	282	67	189
Adj.-R <sup>2</sup>	0.193	0.120	0.297	0.250

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.

**Table 6 – Difficulty in Initiating/Renewing a Line of Credit: Probit Regressions**

This table reports results from a probit regression where the dependent variable takes the value of 1 for firms that experienced difficulty in initiating/renewing a line of credit during crisis and zero otherwise. Regressions include a constant term (unreported). The data are from the CFO Survey of the European sample, first quarter 2009. Independent variables' definitions are reported in Table 1. *t*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors adjusted for clustering across observations within industry.

	(1)	(2)	(3)
Cash Flow	-0.017** (-2.04)		-0.019* (-1.73)
Cash Holdings		-0.021** (-2.10)	-0.016* (-1.74)
Large	0.632* (1.70)	0.424 (1.38)	0.528 (1.40)
Public Firm	0.179 (0.81)	0.075 (0.32)	0.121 (0.42)
Investment Grade	0.280 (1.01)	0.209 (0.54)	0.327 (0.92)
Easy Credit	-0.675** (-2.43)	-0.507 (-1.47)	-0.588* (-1.90)
Inv. Growth Prospects	-0.011 (-1.47)	-0.010 (-1.35)	-0.013 (-1.42)
Obs.	142	144	128
Pseudo-R <sup>2</sup>	0.144	0.099	0.158

Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% (two-tail) test levels, respectively.

**Table 7 – Lines of Credit Fee Structure and Maturity Before and During the Crisis**

This table reports information on loan commitment fee structure, variable rate markup on prime and LIBOR rates, and maturity for lines of credit in Europe and the U.S. before and during the crisis. The data are from the second quarter of 2009. We delete firms that are financial, governmental, or nonprofit organizations.

			Difference
Panel A: Europe	During Crisis	Before Crisis	During – Before the Crisis
	(1)	(2)	(3)
Basis Point Commitment Fee	22.556	20.772	1.784
Basis Point Markup on LIBOR/Prime Rate	115.545	87.886	27.658**
LC Maturity (in months)	26.850	30.500	-3.650**
Panel B: U.S.			
Basis Point Commitment Fee	26.408	12.668	13.740***
Basis Point Markup on LIBOR/Prime Rate	188.576	124.144	64.432***
LC Maturity (in months)	27.559	30.133	-2.574***

Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% (two-tail) test levels, respectively.

**Table 8 – Lines of Credit Commitment Fees and Firm Characteristics**

This table reports probit results from the commitment fee model based on Shockley and Thakor (1997). The dependent variable is equal to 1 if the firm reports a commitment fee for its outstanding line of credit and zero otherwise. Regressions include a constant term (unreported). The data are from the European sample, second quarter of 2009. Independent variables' definitions are reported in Table 1. *t*-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors adjusted for clustering across observations within industry.

Shockley-Thakor-like Specification	(1)	(2)	(2)	(4)	(5)
Cash Flow		-0.029*** (-2.95)		-0.020*** (-2.82)	-0.030* (-1.77)
Cash Holdings			-0.041** (-2.32)	-0.043*** (-2.57)	-0.056* (-1.72)
Cash Flow×Cash Holdings					0.001 (0.48)
Size of LCs	0.018** (2.24)	0.019** (2.24)	0.023*** (2.85)	0.023*** (3.03)	0.025** (2.44)
Large	0.299 (0.52)	0.599 (0.99)	0.709 (1.39)	0.935 (1.63)	1.075** (2.14)
Public Firm	0.444* (1.66)	0.411 (1.42)	0.394 (0.99)	0.463 (1.25)	0.394 (1.05)
Investment Grade	0.615* (1.70)	0.908** (2.26)	1.173*** (3.67)	1.428*** (4.27)	1.358*** (4.79)
Easy Credit	-0.398* (-1.66)	-0.155 (-0.58)	-0.552* (-1.65)	-0.344 (-0.94)	-0.301 (-0.75)
Inv. Growth Prospects	-0.015** (-2.13)	-0.012* (-1.68)	-0.020*** (-2.86)	-0.018*** (-2.77)	-0.017*** (-2.57)
LC Collateral Dummy (Yes=1)	0.148 (0.28)	0.341 (0.63)	0.036 (0.07)	0.132 (0.23)	0.113 (0.19)
LC Maturity (in Months)	-0.003 (-0.40)	-0.010 (-1.62)	0.001 (0.07)	-0.004 (-0.53)	-0.006 (-0.75)
Obs.	55	51	51	49	49
Pseudo-R <sup>2</sup>	0.112	0.192	0.173	0.236	0.241

Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1%, 5%, and 10% (two-tail) test levels, respectively.

**Table 9 – The Interplay between Cash Holdings and Lines of Credit in the Corporate Spending Process**

This table reports OLS and Instrumental Variable (IV) estimation results from investment regressions. Regressions include industry-fixed effects. The dependent variable is the CFO's pro forma planned percentage changes in capital expenditures over the next 12 months. The data are from the European and U.S. samples, first quarter of 2009. Regressions include a constant term (unreported). Test-statistics reported in parentheses are based on heteroskedasticity-consistent standard errors adjusted for clustering across observations within industry using the 2-Step GMM estimator. The table also reports diagnostic statistics for instruments' overidentification (Hansen's  $J$ -stat  $p$ -val. reported) and first-stage  $F$ -test of excluded instruments (lowest  $p$ -val. reported).

	Europe		U.S.	
	OLS (1)	IV (2)	OLS (3)	IV (4)
Cash Holdings	-0.527** (-2.03)	-0.641* (-1.75)	-0.136 (-0.52)	-0.565** (-2.14)
LCs	-0.389*** (-5.28)	-0.367** (-2.31)	-0.203*** (-3.43)	-0.332*** (-3.00)
Cash Holdings×LCs	1.265*** (4.24)	1.489*** (3.09)	1.127* (1.78)	1.814** (2.53)
Large	-0.135 (-1.05)	-0.162 (-1.37)	0.023 (0.62)	0.018 (0.54)
Public Firm	0.049 (0.49)	0.009 (0.09)	-0.061 (-1.54)	-0.049 (-1.26)
Investment Grade	0.109*** (2.93)	0.096*** (5.58)	0.028 (0.84)	0.031 (0.97)
Easy Credit	-0.018 (0.17)	0.008 (0.10)	0.081*** (2.57)	0.084*** (2.74)
Obs.	68	66	215	208
Adj.-R <sup>2</sup>	0.150	0.122	0.033	0.016
<b>Diagnostic Statistics</b>				
Hansen's $J$ -Stat. ( $p$ -val.)		0.194		0.618
First-Stage $F$ -test (lowest $p$ -val.)		0.000		0.000

Note: \*\*\*, \*\* and \* indicate statistical significance at the 1%, 5% and 10% (two-tail) test levels, respectively.