

# The Real Effects of Financial Constraints: Evidence from a Financial Crisis\*

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## **Abstract**

The global credit crisis of 2008 provides a unique opportunity to study the effects of financial constraints on real corporate actions. In contrast to previous research which has used proxies such as firm size and credit ratings to measure constraints, we survey 1,050 CFOs in the U.S., Europe and Asia and directly assess whether firms are credit constrained. Our evidence shows that the impact of the credit crisis was severe on constrained firms, leading to deep cuts in R&D, employment, and capital spending. These firms burn through more cash, draw more heavily on lines of credit for fear banks will restrict access in the future, and sell more assets to fund their operations. Among other results, we find that a greater proportion of unconstrained firms resist using lines of credit in order to preserve their reputation in the financial markets. Using our direct measure of constraints, we also find that the inability to borrow externally causes many financially constrained firms to bypass attractive investment projects, with 86% of U.S. CFOs saying their investment has been restricted during the credit crisis of 2008 and more than half outright cancelling or postponing their investment plans. Our results also hold in Europe and Asia, and in many cases are stronger in those economies.

Key words: Financial crisis, financing constraints, investment spending, liquidity management

JEL classification: G31.

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# 1 Introduction

In the fall of 2008, world financial markets were in the midst of a credit crisis of historic breadth and depth. In this paper, we provide a unique perspective of the impact of the crisis on the real decisions made by corporations in the United States, Europe, and Asia. While the crisis is dramatic and unfortunate, it provides an opportunity to study how financial constraints impact corporate behavior.

We survey 1,050 chief financial officers (CFOs) in the U.S., Europe, and Asia in December 2008. The crisis environment allows us to draw sharp contrasts between firms that are financially constrained versus those that are less so. We use this experimental design to study the effects on certain corporate spending and disbursement policies, liquidity management strategies, and corporate investment.

Most of the previous research on financial constraints is based on financial statement data filed by U.S. public companies. These papers often investigate the impact of constraints on investment policy, sometimes examining whether investment at constrained firms is more likely to be driven by cash flows (because constrained firms are unable to borrow to pursue all available value-enhancing projects).<sup>1</sup> Papers in this literature typically proxy for financial constraint with characteristics like small firm size, nondividend paying status, or poor credit ratings. One distinguishing feature of our experiment is that we ask directly which firms are financially constrained. As we discuss below, this direct measure of financial constraint leads to more powerful contrasts of constrained versus unconstrained activity than do the traditional proxies for financial constraint. Other unique features of our experimental design are that we are able to examine both public and private companies, and also able to study European and Asian firms in addition to those in the U.S.

Our analysis can be grouped into several main parts. First, we examine the pro forma plans of companies conditional on whether they are financially constrained. Due to the credit crisis and ensuing recession, we accordingly find that the typical sample company expects to cut employment, R&D spending, capital investment, marketing expenditures, and (on average) dividends. Using proxies based on traditional measures of financial constraint (size of revenues and credit ratings), as well as a contrast based on public versus private ownership, we find that small, private, speculative “constrained” firms were more severely affected by the credit crisis. That is, these firms plan deeper cuts in 2009. However, none of the cross-sectional comparisons that are based on these traditional proxies are statistically significant. In stark contrast, based on the direct measure of financial constraint

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<sup>1</sup>Hubbard (1998) and Stein (2003) provide lucid reviews of this large body of research.

from the survey, we find stronger and statistically significant results that constrained U.S. firms plan to dramatically reduce employment (by 11%), R&D spending (by 22%), capital investment (by 9%), marketing expenditures (by 33%), and dividends (by 14%) in 2009. In sum, our unique measure of financial constraint provides a much sharper view of the impact the credit crisis compared to proxies that are based on traditional variables. We also find strong support for these implications based on the European and Asian data.

Our second area of analysis is related to liquidity management, in particular cash management and line of credit policy. We start by documenting that the typical U.S. sample firm has cash and liquid assets equal to about 15% of asset value in 2007. Unconstrained firms are able to maintain this level cash balance into late fall 2008. However, constrained firms burn through about one-fifth of their liquid assets over these months, ending the year with liquid assets equal to about 12% of asset value. The same pattern of cash burn for constrained firms is evident in Europe and Asia. This evidence is consistent with the view that financially constrained firms build cash reserves to insulate themselves from credit supply shocks. We also examine where firms hold their cash balances during a credit crisis. Perhaps due to few other choices, bank and money market accounts are used heavily. We also document a flight to quality, with a significantly larger share of cash balances being held as Treasury Securities among unconstrained U.S. firms.

We also study lines of credit. The typical U.S. firm has a pre-arranged line of credit of approximately 18% (unconstrained firms) to 26% (constrained firms) of book asset value. The differences are more dramatic in Europe and Asia, where constrained firms have committed credit lines greater than 30% of asset value. We ask the firms what they do with the proceeds when they draw down lines of credit. About half of CFOs around the world say that they use the funds for daily operations or short-term liquidity needs. In addition, 13% of constrained U.S. firms indicate that they draw on their credit line now, in order to have cash for future needs. Another 17% of constrained U.S. firms draw down on their credit lines now just in case their banks might deny them a line of credit in the future. This surprising result is consistent with the evidence in Ivashina and Scharfstein (2008), who argue that much of the robust bank borrowing during 2008 was due to “just in case” draw downs on credit lines. Our analysis adds to their findings by documenting that constrained firms are significantly more likely (than unconstrained firms) to draw down in anticipation of banks restricting credit in the future. This effect is even stronger in Europe and Asia.

We also inquire why some firms have not drawn on their credit lines. The most common response is that the CFOs want to preserve borrowing capacity in case it is needed in the future. The second

most common explanation for not fully drawing the credit line is to maintain a strong reputation in the eyes of financial institutions. This preserving reputation explanation is significantly stronger among public firms and speculative firms. In Europe, preserving reputation is significantly stronger among constrained companies.

We also ask the CFOs whether they have become more concerned about counter-party risk in derivative transactions since the collapse of Lehman in September 2008. Among firms that use derivatives, public firms and large firms (the companies we suspect are most likely to participate in derivatives transactions) are particularly concerned. Indeed, over 80% of the public corporations in our survey express increased concerns with counter-party risk in derivatives since the Lehman's collapse (50% say they are "very concerned" with that risk).

Our third set of analyses examines in detail capital market effects on corporate investment decisions. We start by benchmarking how often companies say they have to bypass attractive ( $NPV > 0$ ) investment projects because of financial constraints. In the U.S., in normal credit markets, 46% of constrained companies say that they pass up attractive investment opportunities due to financial constraints. Recall that these are firms that declared themselves to be constrained in late Fall 2008. Undoubtedly, some of these firms would be constrained and some not constrained in "normal times." One interpretation of our result is therefore that 46% of these firms are constrained during normal times (which limits their ability to pursue attractive projects in normal times). The 46% of self-declared constrained firms that say they pass up attractive investments is significantly greater than the 20% of unconstrained firms who say the same. In Europe and Asia, too, more than twice as many constrained firms pass up value-enhancing projects due to credit constraints.

Because we conducted the survey during a severe credit crisis, we are able to investigate the effects of financial constraints on investment during extreme circumstances. Fully 86% of constrained U.S. firms say that they bypass attractive investments during the credit crisis due to difficulties in raising external finance, about twice as great as the proportion of unconstrained firms that say the same. Again, these numbers are mirrored (and are even a bit stronger) in Europe and Asia. (We stress that these results are stronger for our new and direct measure of financial constraint than they are for the more traditional measures of constraint.)

We next inquire about how firms fund attractive investments when they are unable to borrow in financial markets. About half of U.S. firms say that they rely on internally generated cash flows to fund investment under these circumstances, and about four in ten say that they use cash reserves. Notably, 56% of constrained U.S. firms say that they cancel investment projects when they are unable

to fund them with external funds, significantly greater than the 31% of constrained firms that say the same. Once again, we find these same results in Europe and in Asia. To our knowledge, this is the first time that constraint-driven project cancellation has been documented in the literature.

Not only do some firms cancel investment due to tight credit markets, some sell assets to obtain cash. We find that the vast majority of financially constrained firms have sold assets in order to fund operations in 2008, while unconstrained firms show no significant propensity sell assets. We also find evidence of heavy use of asset sales to obtain funds in Europe and Asia.

The remainder of the paper is organized as follows. We provide details of our survey data in Section 2. Section 3 examines the interplay of firm demographic characteristics and corporate policies in the 2008 financial crisis. Section 4 introduces our measure of financial constraints and examines how it shapes corporate decisions. Section 5 and 6 discuss, respectively, liquidity management and investment policies during the crisis. Section 7 concludes the paper.

## 2 Data

We use information from a special survey of CFOs conducted in the fourth quarter of 2008. Our analysis considers responses from 1,050 non-financial firms in the United States, Europe, and Asia.

We start by examining how an array of corporate policies (e.g., capital expenditures, employment, dividend payments) vary conditional on demographic information. The firm characteristics that we condition on include (1) headquarters location (U.S., Europe, and Asia), (2) firm size (small vs. large firms based on sales revenue), (3) credit ratings (speculative vs. investment grade), and (4) ownership form (private vs. public firms). Many of these characteristics are thought to be related to the firm's ability to raise funds in the capital market.

Our survey allows the unique opportunity to directly ask managers whether their corporate decisions have been constrained by the cost or availability of credit. Since we want to understand the role of financial markets in shaping corporate decisions during credit crises, we study the relation between firm characteristics (such as size and credit rating) and whether managerial policies are influenced by credit markets. Accordingly, we also condition the questions we examine on whether or not corporate executives indicate their firms are credit constrained.

The survey approach allows us to ask unique questions but there are potential issues related to using surveys to gather data. While we consulted with experts and refined the survey questions, it is still possible that some of the questions are misunderstood or otherwise produce noisy measures of the desired variable of interest. In addition, field studies need to consider that market participants

do not necessarily have to understand the reason they do what they do in order to make (close to) optimal decisions. It is also possible that the respondents are not representative of the underlying population. Finally, our survey was conducted at one point in time, so we can not exploit advantages that are sometimes available in panel data sets. Even with these considerations, we believe that our study provides unique measures of financial constraint and its effect on firms. We hope that researchers will use our results to develop new theories or potentially modify existing views.

We created an initial survey instrument based on existing theoretical and empirical research. We then solicited feedback from academics and practitioners on the initial version of the survey. We surveyed CFOs in the U.S., Europe, and Asia. Many of these CFOs are subscribers of CFO magazine, CFO Europe, and CFO Asia; others are executives who have participated in previous surveys conducted by Duke University.

The U.S. survey was conducted via E-mail invitation on November 25, 2009, and a reminder E-mail was sent one week later. The survey closed on December 5, 2009. Due to logistical issues, the European and Asian surveys were started and ended about one week earlier. Most of those surveyed have the job title CFO. Some have the title of Treasurer, Assistant Treasurer, V.P. Finance, Comptroller, or a similar title. We refer to this group collectively as CFOs. Our final dataset has responses from 574 American, 190 European, and 286 Asian CFOs.<sup>2</sup>

### 3 Firm Demographics and Corporate Policies During the Crisis

We start by examining corporate plans for 2009, plans that were made in the midst of the credit crisis of 2008. We are interested in gauging how firms respond to a contraction in aggregate credit and demand, and in particular, how firm characteristics that are usually associated with access to external financing may shape firm responses.

We ask managers about *planned percentage changes* for the next 12 months (relative to the previous 12 months) in their firms' R&D expenditures, capital expenditures, marketing expenditures, hiring (number of domestic employees), cash holdings, and dividend payments. We begin with graphical analyses, breaking down the responses to the crisis by firm demographics. These responses, presented in percentage terms, are reported in Figure 1.<sup>3</sup>

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<sup>2</sup>The survey questions can be found at [http://faculty.fuqua.duke.edu/cfosurvey/09q1/HTML\\_US/Q4\\_08\\_1.htm](http://faculty.fuqua.duke.edu/cfosurvey/09q1/HTML_US/Q4_08_1.htm). The Asian and European surveys are also available upon request. Note that European CFOs were given the opportunity to take the survey in any of four languages: English, French, German, or Dutch. The Asian survey was only available in English.

<sup>3</sup>Respondents are allowed to input quantities between  $-100\%$  and  $500\%$  when responding to this question and we observe some extreme outliers. To minimize the impact of these extreme entries on our inferences, we winsorize

**Geographical Region** The first panel of Figure 1 categorizes corporate policy responses by the geographic regions in which their firm is headquartered.

Panel A of Figure 1 has many notable features. One salient result is that, around the world, firms are planning major cuts in (almost) all the policy variables that we examine. For example, American and European companies in the survey are planning to cut R&D research by over 10% during the next 12 months. In contrast, American firms are expecting the smallest cuts in capital expenditures. Also noteworthy, European companies plan to accumulate significant cash over the next year, while Asian companies will actually increase their numbers of domestic employees.

These regional disparities suggest that we should not indiscriminately bundle together data from different regions when analyzing the impact of the financial crisis on corporate policies. In what follows we analyze the three regions separately. To make the analysis manageable and consistent, we base our exposition on the responses from U.S. CFOs. However, we report results for both European and Asian CFOs whenever we gain additional insights from non-U.S. data and when we need to check the robustness of the U.S.-based inferences.

**Size** We split the companies into small and large categories according to their sales revenue. Firms with total gross sales amounting to less than \$1 billion are categorized as “small.” In contrast, those with sales in excess of \$1 billion are classified as “large.” Accordingly, we have 430 small firms and 134 large firms in the U.S. Our results are largely insensitive to how we choose cut-offs for the size categorization. The same applies to using the number of employees (in lieu of sales figures) as a proxy for size. For example, experiments involving size yield the same inferences if we classify as “small” those companies with less than 500 employees and as “large” those with more than 5,000 employees.

Panel B of Figure 1 suggests that differences between small and large company policy responses to the current economic environment are modest. Large firms plan bigger cuts in R&D expenditures, while small firms expect to implement larger cuts in capital expenditures. Small firms also seem to be cutting marketing expenses more, and saving less cash. While suggestive, the figures depicted do not reveal whether policy differences across small and large firms are statistically significant.

**Ownership Form** Public firms are those either traded on the NYSE or NASDAQ/AMEX. We have 342 private firms and 130 public firms. Public firms’ plans for the next 12 months imply, on average, sharper cuts in R&D spending compared to private firms’ plans (16% versus 8% reduction in responses in the 1% tails.

R&D). On the flip side, private firms will cut marketing and capital expenditures by more. Public and private firms seem to be adopting similar financial policies (cash holdings and dividend distributions) for 2009.

***Credit Ratings*** We categorize the respondents into “speculative grade” and “investment grade” rated firms if their S&P credit ratings are, respectively, BB+ or below, and BBB- or above. In the survey, managers are free to indicate the ratings they believe their firms should have, in the absence of a formal rating. However, our tests only consider firms with actual ratings (as assigned by rating agencies and reported by the CFOs on the survey). We have 30 speculative grade firms and 98 investment grade firms in our U.S. sample. The differences between speculative- and investment-rated firms’ policies are more pronounced than those based on size and ownership form. Speculative companies plan significant reductions across all expenditure categories (including employment). These firms also plan for smaller cash reserves and greater dividend cuts over the next 12 months. Investment grade firms also plan to cut across all the real and financial policy variables, but those cuts are smaller by comparison.

## 4 Beyond Demographics: Assessing Financial Constraints

Characteristics such as size, ownership, and credit ratings are traditionally used to gauge the ease with which firms might access the credit markets. If access to external finance is important for corporate policies during a time of crisis, we would expect to see pronounced differences in pro forma planning of small, private, poorly-rated firms relative to large, public, highly rated ones. While the previous graphs leave it open to interpretation whether such differences exist, our survey allows for an unique opportunity to gauge the extent to which firms encounter difficult access to credit. In particular, we directly ask CFOs whether their firms’ businesses have been affected by the cost or availability of external financing; i.e., whether they are “financially constrained.” It is important to highlight the novelty of our approach, and the extent to which we can gather new insights into the connections between capital market frictions and corporate policies.

A large body of literature examines the impact of capital market imperfections on corporate behavior. In this literature, the standard approach to empirical work is for the researcher to look at archival data and use metrics such as firm size, ownership, and credit ratings to characterize a company as either financially constrained or unconstrained.<sup>4</sup> Financially constrained firms are unable

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<sup>4</sup>Other related measures include firm age (Oliner and Rudibush (1992)), dividend payout ratios (Fazzari et al.



Figure 1: This figure displays firms’ planned changes (% terms) in R&D expenditures, capital expenditures, marketing expenditures, total number of domestic employees, cash holdings, and dividend payments over the next 12 months. Responses are averaged across firms within categories determined according to size (sales revenue), ownership form, and credit ratings. See text for additional details.

to optimize policies such as investment and savings, and are expected to absorb much of the toll of an economic crisis (see Gertler and Gilchrist (1994)). One exception to the traditional approach in this area is the work of Kaplan and Zingales (1997). Those authors review statements by firm managers that were entered in 49 firms’ public records (e.g., 10-Ks) to gauge those firms’ degree of constrainedness. Kaplan and Zingales then subjectively classify firms in categories of constraint.

In contrast to the existing literature, we directly ask managers to rank their degree of constrainedness during a time of crisis. Importantly, their opinions are expressed in a private, anonymous setting (an academic survey) and their views are unlikely to be affected by concerns about market reactions to their assessment of their companies’ difficulties in raising capital.

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(1988)), and affiliation to a conglomerate structure (Hoshi et al. (1991)).

Our survey asks managers to indicate whether they are “not affected,” “somewhat affected,” or “very affected” by difficulties in accessing the credit markets. In the U.S., we have 244 respondents indicating that they are unaffected by credit constraints, 210 indicating that they are somewhat affected, and 115 indicating that they are very affected. To ease exposition, we label the first category as “unconstrained firms,” while the last category is labeled “financially constrained firms.” It does not affect our inferences how we classify the middle category. We choose not to discard the middle category, so as to preserve information and testing power. Instead, we combine it with the “no effect” category. Having two (as opposed to multiple) constraint categories facilitates the use of different econometric techniques latter implemented (e.g., mean comparison tests and matching estimators) and also aids the exposition of our results.

We want to determine whether our self-reported measure of financial constraints does a good job at identifying the effect of credit supply shocks on corporate policies. In particular, we want to evaluate whether it does a better job at identifying, in the cross-section, the firms that most strongly respond to the current crisis. Before we do so, we study whether our measure of constraints is associated with — and might be subsumed by — standard measures of constraints. We do this by way of a standard (two-tailed) means comparison tests.<sup>5</sup>

In Table 1, we compare averages of firms reporting constraints across size, ownership, and credit rating categories.<sup>6</sup> Column 3 shows that similar proportions of firms report being financially constrained across ownership categories (private and public companies). Smaller companies (under column 1) tend to report a greater degree of constraint than do larger firms (22% versus 16%), but differences are not statistically significant. Finally, speculative-rated firms report much higher constraint rates than do investment-rated firms; speculative-rated firms are more likely to be constrained by a factor of nearly two (30% versus 17%). But once again, *t*-tests for mean differences fail to detect reliable significance (*p*-value of 11%).

Table 1 suggests that the degree to which firms report credit constraints is not well explained by standard observable metrics such as size, ownership, and credit ratings. In what follows, we therefore

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<sup>5</sup>Throughout the analysis, we conduct group contrasts using mean comparison tests. However, in every case, we also look at median tests (rank-sum Mann-Whitney two-tail tests). Our inferences are the same whether we use mean or median comparisons.

<sup>6</sup>In the spirit of Fazzari et al. (1998), we also experiment with a dividend-based classification scheme. In particular, we have information on whether the respondent firm paid dividends last year. We partition the data into dividend payers and nonpayers, under the traditional assumption that the first group of firms are unconstrained in their access to external finance, while the second group is constrained. This measure of constraint yields qualitatively the same results we obtain for size, ownership, and credit ratings. We omit the results from this traditional measure of financial constraint for space considerations, but we make the results available upon request.

**Table 1. The Relation between Firm Demographics and Financial Constraints**

This table displays mean comparisons for proportion of firms that report being “financially constrained” across different group categories. Category 1 groups firms that are small, private, and speculative-grade rated. Category 2 groups firms that are large, public, and investment-grade rated. The data is collected from the U.S. survey. *t*-Statistics in (parentheses).

Criteria	Category 1	Category 2	Diff. Categories
By Size	0.216*** (10.93)	0.158*** (4.97)	0.058 (1.45)
By Ownership	0.220*** (9.72)	0.185*** (5.40)	0.035 (0.83)
By Ratings	0.300*** (3.53)	0.169*** (4.89)	0.131 (1.61)

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

conduct various analyses that rely on our new, direct measure of financial constraint, conditioning tests on the degree to which firms say they are financially constrained.

To illustrate how financing constraints affect corporate policies, we replicate the graphs presented above (on corporate policies), conditioning on two partitioning schemes. The first represents the original three categorizations of financial constraints: unconstrained, somewhat constrained, and very constrained. Panel A of Figure 2 shows an interesting, “monotonic” relation between the degree to which the firms are financially constrained and how much they plan to reduce their expenditures (R&D, fixed capital, marketing, and employment) as well as distributions (dividend payments) in 2009. The second panel, in turn, shows that those sharp policy contrasts between constrained and unconstrained firms are preserved if we merge the last two constraint categories (i.e., somewhat constrained and unconstrained companies).

We consider the same contrast using data collected in Europe and Asia. Figure 3 displays the 2-category constraint characterization for European firms (Panel A) and Asian firms (Panel B). Compared to the U.S., the results indicate milder policy contrasts between constrained and unconstrained firms in Europe, with all firms signaling significant cuts in their policies. However, Asian firms show very pronounced differences in business plans for constrained versus unconstrained firms. Constrained Asian firms respond to the crisis with cuts in all fronts, except hiring. Unconstrained Asian firms, on the other hand, plan to spend more on capital acquisition, marketing, and employment over the next 12 months.

While Figure 2 suggests that real and financial policy plans are quite different across financially

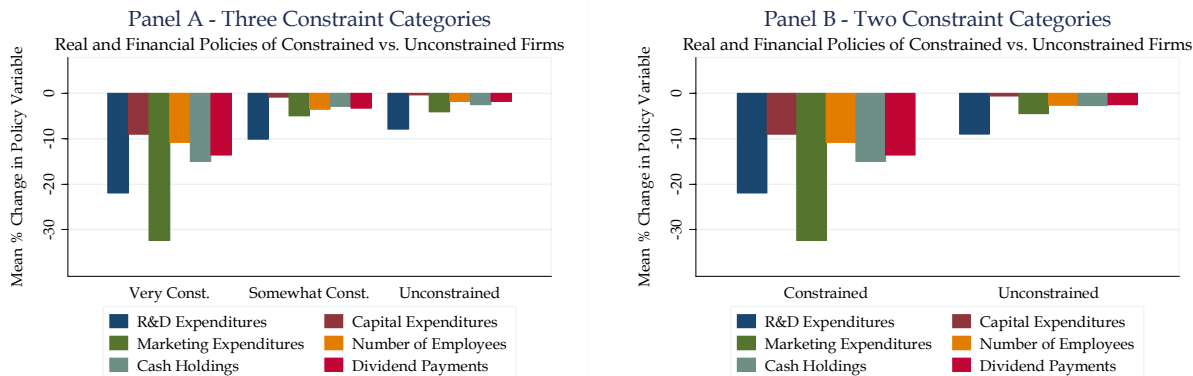


Figure 2: This figure displays U.S. firms’ planned changes (% terms) in R&D expenditures, capital expenditures, marketing expenditures, total number of domestic employees, cash holdings, and dividend payments over the next 12 months. Responses are averaged across different degrees of financial constraints. See text for additional details.

constrained and unconstrained firms, the graphs do not provide a formal test for those differences. We do so via a standard mean comparison test, whereby we compare the policy averages of the two constraint groups (cf. Panel B of Figure 2). Table 2 confirms the intuition from Figure 2: firms that are more affected by credit constraints during the crisis plan to contract policies in a pronounced manner, while firms that are unconstrained plan much smaller cuts (sometimes statistically indistinguishable from zero). To illustrate this contrast, note that financially constrained firms plan to reduce their capital spending, on average, by a whopping 9% in the next 12 months alone. Unconstrained firms, in stark contrast, are likely to keep their capital spending rates nearly constant (a negligible 0.6% decline). Importantly, notice from column 3 in the table that differences across groups are highly statistically significant for *all* of the real and financial policies examined.

Our measure of financial constraint reveals a significant cross-sectional wedge in every corporate policy we look at following the 2008 credit supply shock. The traditional constraint measures, in contrast, fail to reveal any systematic cross-sectional patterns. Needless to say, the ability to identify those firms — and sectors of the economy — most vulnerable to credit crises is of great importance for researchers and economic policy makers.

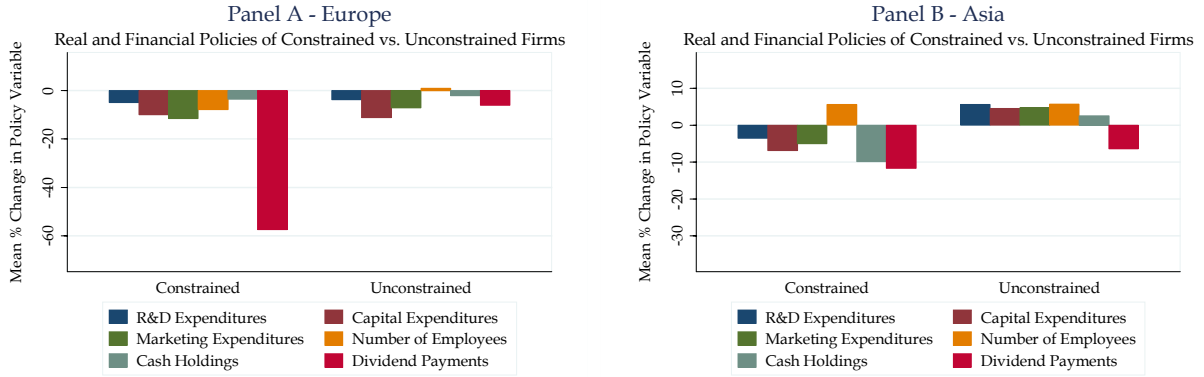


Figure 3: This figure displays European and Asian firms’ planned changes (% terms) in R&D expenditures, capital expenditures, marketing expenditures, total number of domestic employees, cash holdings, and dividend payments over the next 12 months. Responses are averaged across different degrees of financial constraints. See text for additional details.

**Table 2. Corporate Polices of Financially Constrained and Unconstrained Firms**

This table displays the mean of planned percentage changes in various real and financial policies of firms according to whether they are financially constrained or financially unconstrained using our proposed measure of financial constraint. The data is collected from the U.S. survey. *t*-Statistics in (parentheses).

Policy	Constrained	Unconstrained	Diff. Const – Unconst
% Change in R&D Expenditures	-21.954*** (-5.31)	-8.980*** (-6.13)	-12.974*** (-3.58)
% Change in Capital Expenditures	-9.062** (-2.38)	-0.610 (-0.46)	-8.452*** (-2.59)
% Change in Marketing Expenditures	-32.375** (-2.49)	-4.520* (-1.78)	-27.855*** (-3.41)
% Change in Employees	-10.867*** (-5.81)	-2.720*** (-4.81)	-8.148*** (-5.56)
% Change in Cash Hold	-14.988*** (-5.85)	-2.740*** (-3.03)	-12.249*** (-5.56)
% Change in Dividend Pay	-14.176*** (-4.05)	-2.926*** (-3.44)	-11.251*** (-4.62)

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

## 5 Liquidity Management in a Financial Crisis

Results from the previous section suggest that liquidity management plays a central role in how firms are dealing with the credit crisis of 2008. Adverse economic conditions make it more difficult to access external funds in general (even for healthy firms). It is thus important to understand how companies use funding sources such as internal cash and bank lines of credit in order to minimize the impact of the crisis on their business operations.

Our survey asks managers worldwide about their liquidity management practices. In this section, we examine these policies in detail, considering how they vary across firm demographics like location and size as well as the level of financing constraints.

### 5.1 Cash Management

We ask managers about basic issues governing their cash policy decisions. Our first question benchmarks how much cash companies have on their balance sheets in November 2008 when the survey was conducted, and how much they had one year prior to the survey. We illustrate the answers to this question with data from the U.S. We compute the average cash-to-assets ratio for firms in 8 (=4 × 2) different categories related to size, ownership, ratings, and degree of financial constraint.

We first employ graphical analysis to describe how much cash is held by the respondent companies today, as well as how much they held in late 2007. These graphs are broken-down by standard firm characteristics as well as self-declared degree of financial constraint. The following four graphs depict the cash holdings of the sample firms.

Figure 4 shows a wide degree of variation in the *levels* of cash holdings of firms in different categories. For instance, while the average ratio of cash to total assets is only slightly higher across small vis-à-vis large firms (see Almeida et al. (2004)), public firms hold much more cash in their balance sheets than private firms. At the same time, investment grade rated companies hold twice as much cash as speculative companies.

The last panel of Figure 4 suggests something particularly interesting. According to our survey, the cash holdings of constrained and unconstrained firms were very similar one year ago (before the financial crisis). The crisis has not affected unconstrained firms' cash levels, but constrained firms appear to burn through a substantial fraction of their cash reserves. Cash reserves at constrained companies have fallen by one-fifth, from about 15% to about 12% of book assets. In other words, there are noticeable differences between the two groups of firms when one considers *changes* in cash.

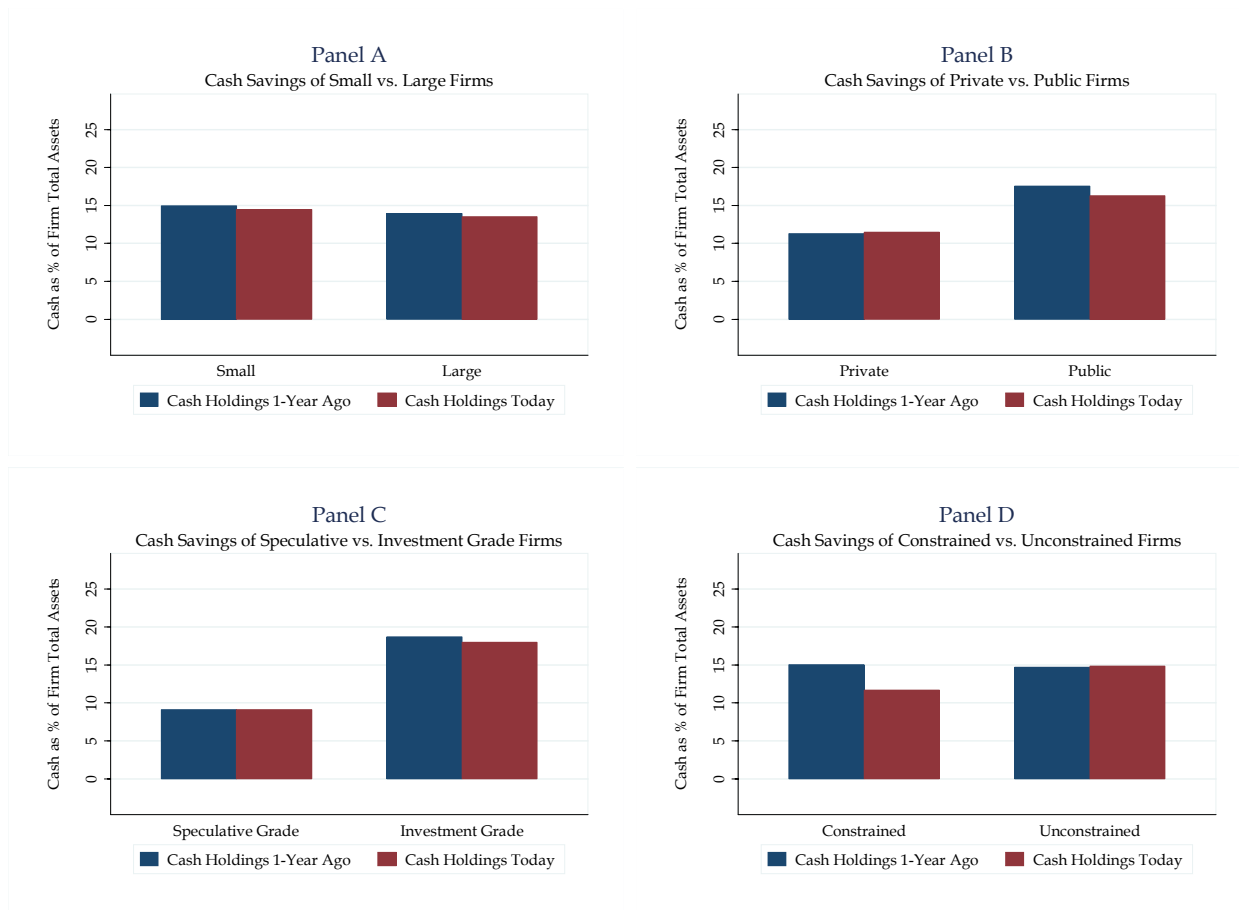


Figure 4: This figure displays firms’ cash savings behavior (the ratio of cash and liquid securities to total assets) now and one year ago. Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

To investigate this issue in more detail, for each firm, we compute the difference between the ratio of cash to assets today and as of one year ago. We then compare those changes conditional on size, ownership, credit ratings, and financial constraints. The mean comparison tests are similar in nature to those performed above. Table 3 reports our findings.

One could conclude that there were no systematic changes in cash policies over the last year if one were to rely on standard, observable financial constraint measures such as size, ownership, and credit ratings. However, once we partition firms according to their reported degree of constraint (row 4 of the table), we observe a pronounced reduction in cash levels among financially constrained firms over the last year ( $-3\%$  of total assets). Over the same time period, there were virtually no changes in the holdings of financially unconstrained firms. The different change in cash holdings across the two groups is highly statistically significant. The numbers in the table suggest that financially

**Table 3. Changes in Cash Holdings over Last Year**

This table displays mean comparisons for changes in the ratio of cash to total assets over the last year for firms across different group categories. Category 1 groups firms that are small, private, speculative-grade rated, and financially constrained. Category 2 groups firms that are large, public, investment-grade rated, and financially unconstrained. The data is collected from the U.S. survey. *t*-Statistics in (parentheses).

Criteria	Category 1 “Constrained”	Category 2 “Unconstrained”	Diff. Categories
By Size	-0.443 (-1.05)	-0.413 (-0.89)	-0.031 (-0.04)
By Ownership	0.188 (0.41)	-1.177 (-1.51)	1.365 (1.51)
By Ratings	0.017 (0.02)	-0.687 (-1.08)	0.704 (0.54)
By Fin. Const.	-3.325*** (-3.13)	0.195 (0.59)	-3.520*** (-4.16)

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

constrained firms have been forced to draw down their cash reserves to cope with the financial crisis. This agrees with intuition, but notice that this phenomenon is not captured by archival measures of constraints, nor to our knowledge has it been reported previously in the literature. Finally, though not shown in the table, we find that similar patterns of pronounced reduction in cash holdings of constrained firms in the crisis are also verified in Europe and Asia. Moreover, unconstrained firms on those two continents, just like in the U.S., do not change their cash-to-asset ratios.

We also ask managers where their firms hold their cash in late Fall 2008, and also where they stored it before the Lehman Brothers collapse in September 2008. Our survey can capture, for example, whether the initial signs of the crisis made CFOs change their cash management styles (e.g., migrate from commercial bank accounts to Treasuries). We compute the proportion of respondents checking any of the options “money market funds,” “Treasuries,” and “commercial bank accounts” in our survey. Respondents are allowed to check all options that apply, so that for each available category we use the following code: unchecked = 0 and checked = 1. We first consider a graphical analysis to describe where respondent firms put their cash today, as well as last year. These graphs are broken-down by size, ownership, and credit ratings, as well as by our measure of financial constraint status.

Figure 5 highlights pronounced differences in the way firms choose to store their cash. Firms that are smaller, private, speculative-rated, and constrained tend to have more of their funds in commercial bank accounts than their counterparts (namely, large, public, investment-grade, unconstrained firms).

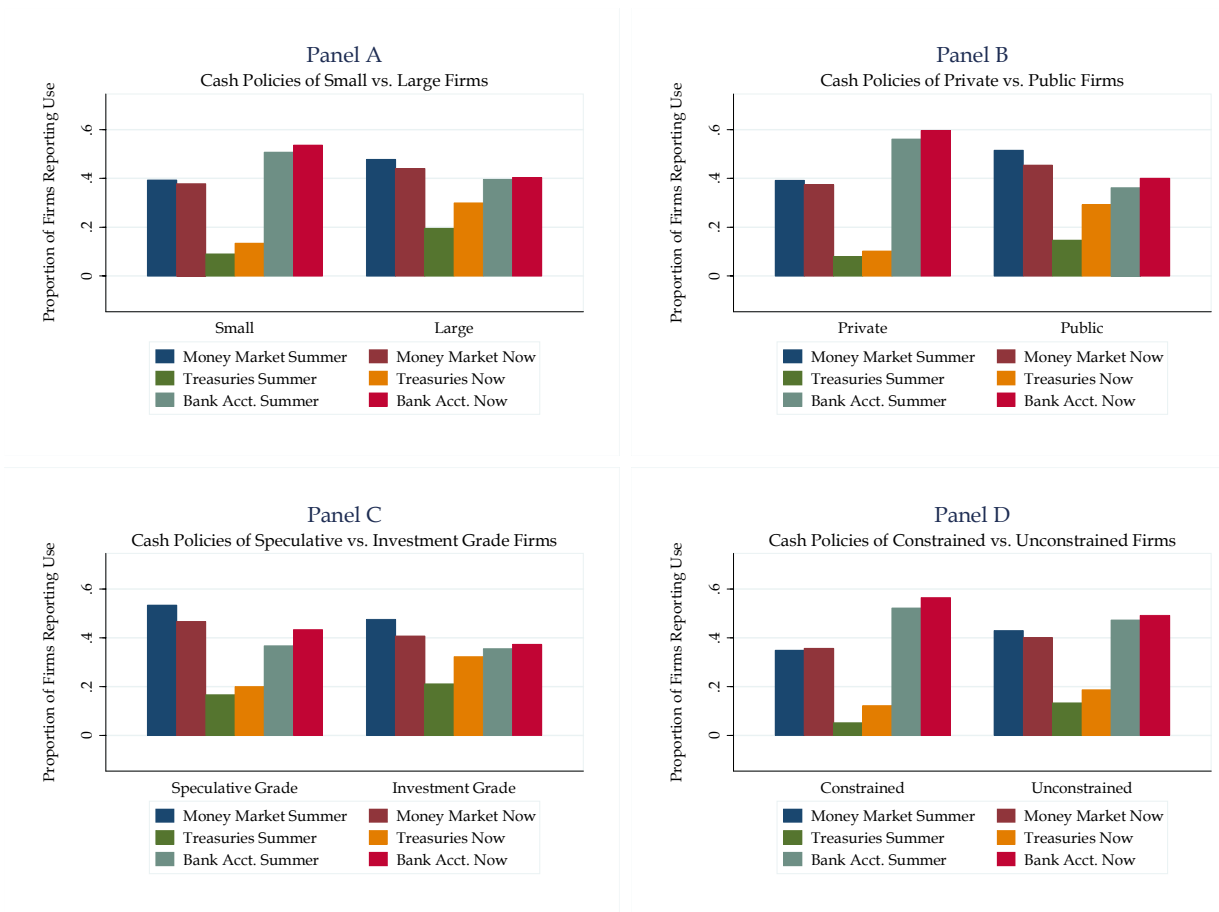


Figure 5: This figure displays firms' cash management (allocation of cash across different liquid instruments) now and last Summer. Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

On the other hand, the latter group of firms tends to hold more Treasuries. The use of money market funds is somewhat more homogeneous across all firms in the survey (with a few exceptions).

Our data allow us to examine whether the allocation of liquid assets by firms has changed in recent times. Figure 5 suggests the absence of pronounced changes in most cash management strategies. To investigate this question in more detail, we compute the changes in the use of the categories we consider and compare those changes across groupings of firms that are based on size, ownership, credit ratings, and financial constraints. Interestingly, we find that larger, public, highly-rated firms shift more pronouncedly to the use of Treasuries following the Lehman collapse. This is consistent with the flight-to-quality hypothesis. A question for future research is, why don't smaller, private, poorly-rated, constrained firms do the same?

## 5.2 Managing Lines of Credit

We also ask executives about their bank line of credit (LC) policies. As with the examination of cash policies, we first ask managers about their holdings of lines of credit now (during the crisis) and also ask them to compare it with the holdings of those lines one year prior. A simple graphical analysis contains the essence of what we find.

As suggested in Figure 6, firms that are small, private, and financially constrained appear to have, on average, higher LC-to-asset ratios than large, public, and unconstrained firms. Despite differences in the *levels* of LC-to-assets, none of these categories display a pronounced *change* in their use of LCs over the last year. Mean comparison tests for changes in LC usage across firms in those categories confirm this inference (output omitted). We find similar behaviors in Europe and Asia, with the exception that constrained firms in Europe seem to increase their use of LCs during the crisis.

Next, we ask CFOs about the factors that lead them to draw cash from their outstanding LCs over the past year. To understand their motivations, we compute the proportion of respondents that check any of the options: “to manage immediate liquidity needs,” “to fund normal daily operations,” “to build cash for the future, as a precaution,” and “to obtain cash now in case the bank restricts LC access in the future.” Respondents are allowed to check all options that apply, so that for each available category we use the following code: unchecked = 0 and checked = 1. The first two options capture the link between firms’ regular use of LC facilities and their business operations, while the last two capture the “strategic” aspect of LC management in the relationship between firms and their banks. We first report a graphical analysis.

Figure 7 indicates that companies that are small, private, speculative-rated, and financially constrained use their LCs significantly more than do their counterparts (i.e., large, public, investment-rated, unconstrained firms) as a way to fund normal business activities. It is harder to distinguish clear patterns in terms of which types of companies manage their LCs motivated by precautionary savings. In addition, Figure 7 does not provide reliable evidence about whether firms draw from their outstanding LCs during a crisis to secure funds that may not be available in the future (because their bankers may restrict access to LCs). We use mean comparison tests to help establish whether these later considerations determine firms’ LCs management. These are presented in Table 4.

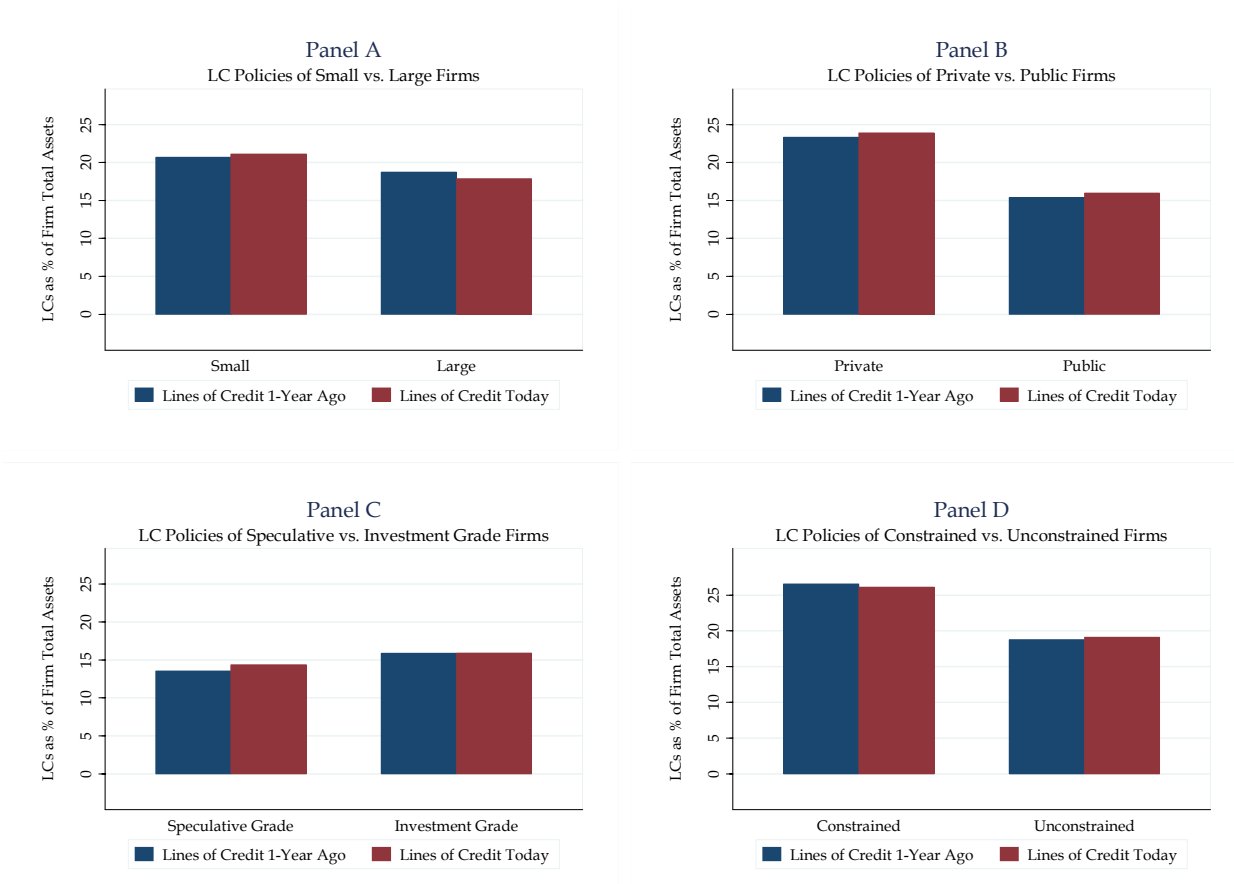


Figure 6: This figure displays firms' LC management behavior (the ratio of LC to total assets) now and one year ago. Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

The results in Table 4 suggest that firm size and credit ratings are not as powerful in explaining corporate strategies regarding how they use funds from their lines of credit. Perhaps counter to intuition, relative to private firms, public firms seem more inclined to draw cash from their LCs because of precautionary motives. They also claim to be actively drawing funds now for fear of imminent restrictions by their banks on LC access. Interestingly, we also find significant differences in LC management across financially constrained and unconstrained firms. Unconstrained firms show the lowest propensity to draw from their LC accounts as a way to build cash stocks or due to concerns about future access to their LCs. In sharp contrast, constrained firms are among the most likely to say that their withdrawal policies are guided by the desire to build precautionary savings. In addition, a significant fraction of constrained firms (16.5%) have drawn funds in the crisis because of concerns that banks will limit their access to their LC facilities in the near future. This latter

**Table 4. Why Do Firms Draw Down their LCs?**

This table displays mean comparisons for the proportion of firms reporting each of the rationales listed as a reason for using their LCs across different group categories. Category 1 groups firms that are small, private, speculative-grade rated, and financially constrained. Category 2 groups firms that are large, public, investment-grade rated, and financially unconstrained. The data is collected from the U.S. survey. *t*-Statistics in (parentheses).

Criteria	Policy	Category 1 "Constrained"	Category 2 "Unconstrained"	Diff. Categories
By Size	Liq. Needs	0.334*** (14.84)	0.299*** (7.52)	0.036 (0.77)
	Daily Opers.	0.464*** (19.48)	0.373*** (8.90)	0.091* (1.85)
	Cash for Future	0.061*** (5.36)	0.142*** (4.69)	-0.080*** (-3.02)
	Cash Now	0.070*** (5.77)	0.112*** (4.09)	-0.041 (-1.55)
By Ownership	Liq. Needs	0.377*** (14.37)	0.246*** (6.49)	0.131*** (2.70)
	Daily Opers.	0.535*** (19.81)	0.315*** (7.71)	0.220*** (4.35)
	Cash for Future	0.061*** (4.72)	0.138*** (4.55)	-0.077*** (-2.73)
	Cash Now	0.064*** (4.84)	0.131*** (4.41)	-0.066** (-2.35)
By Ratings	Liq. Needs	0.433*** (4.71)	0.288*** (6.88)	0.145 (1.53)
	Daily Opers.	0.567*** (6.16)	0.314*** (7.31)	0.253*** (2.61)
	Cash for Future	0.233*** (2.97)	0.110*** (3.81)	0.123* (1.77)
	Cash Now	0.133** (2.11)	0.110*** (3.81)	0.023 (0.35)
By Fin. Const.	Liq. Needs	0.504*** (10.77)	0.282*** (13.34)	0.222*** (4.62)
	Daily Opers.	0.548*** (11.75)	0.421*** (18.14)	0.127** (2.46)
	Cash for Future	0.130*** (4.14)	0.068*** (5.76)	0.062** (2.19)
	Cash Now	0.165*** (4.75)	0.059*** (5.35)	0.106*** (3.76)

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

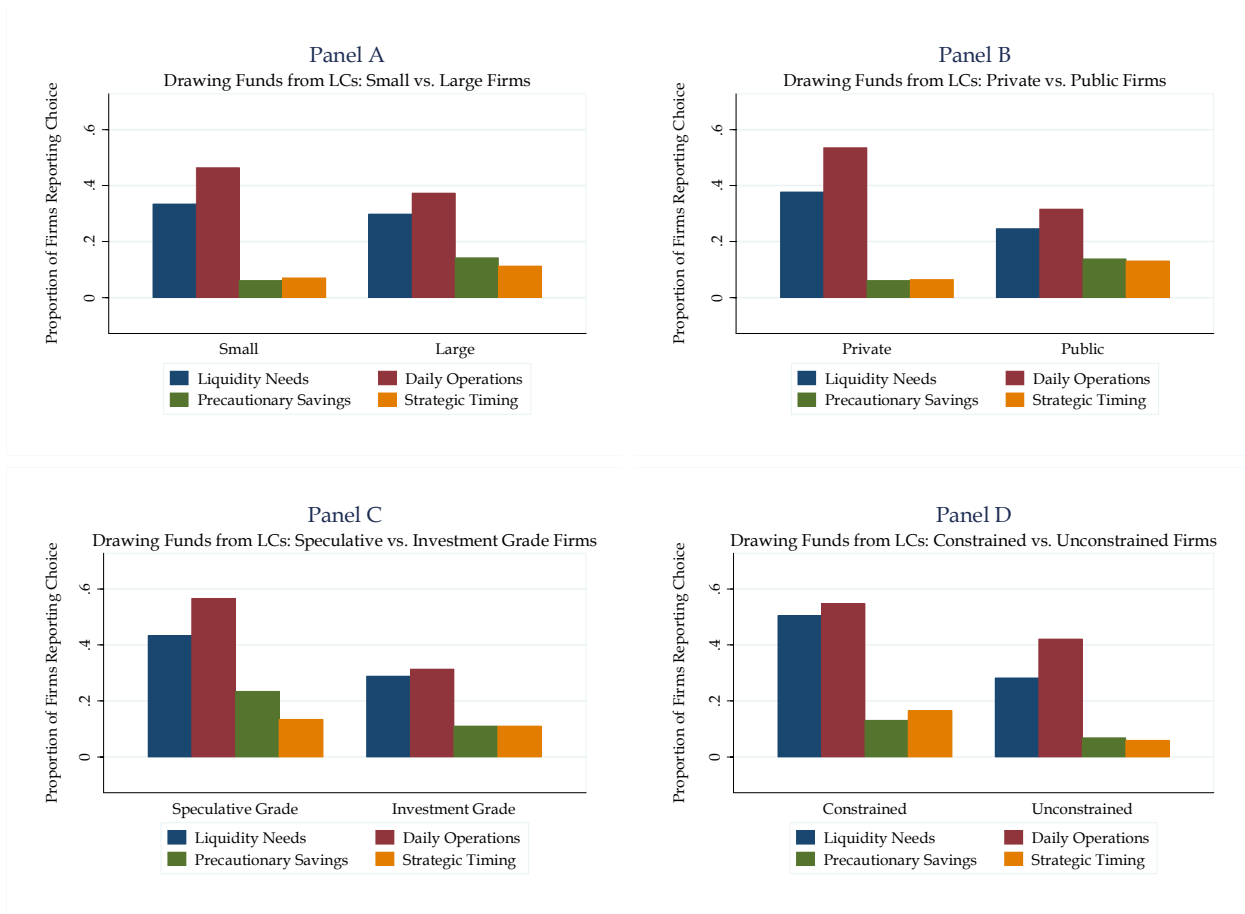


Figure 7: This figure displays firms’ LC management behavior (reasons for withdrawing funds from existing LCs). Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

finding is consistent with recent work of Ivashina and Scharfstein (2008), who document a “draw now, just in case” phenomenon during 2008. Our analysis adds to those authors’ findings by tying this behavior to financially constrained firms.

We look overseas to determine whether companies world-wide manage their LCs in ways consistent with their American counterparts. We find very similar patterns abroad. These are depicted in Figure 8. Foreign firms rely heavily on LCs for their immediate liquidity needs and daily operations. More interestingly, we find that constrained firms in Asia manage their lines of credit with an eye on building precautionary savings, while constrained European firms do not. Regarding the issue of strategic “in case of future restriction” timing behavior of LC withdrawals, we find that, just like in the U.S., constrained European and Asian firms draw down much larger amounts of funds than unconstrained firms for fear that their banks will restrict access to those funds during the crisis.

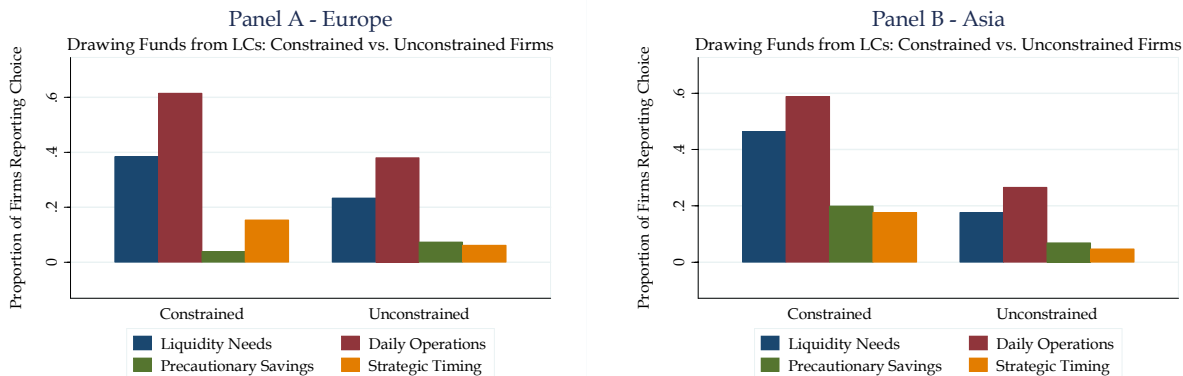


Figure 8: This figure displays firms’ LC management behavior (reasons for withdrawing funds from existing LCs). Sample firms are from Europe (Panel A) and Asia (Panel B). Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

Finally, we ask managers whether they have recently voluntarily limited their use of lines of credit, and inquire about the reasons behind limiting LC draw downs. To understand those reasons we compute the proportion of respondents checking any of the options: “to avoid paying fees,” “interest rate is too high,” “to preserve reputation amongst bankers and credit markets,” and “to save unused borrowing capacity.” Again, respondents are allowed to check all options that apply, so that for each available category we use the following code: unchecked = 0 and checked = 1. The first two options capture regular business concerns with the cost of LC facilities. The last two capture strategic aspects of LC management. As before, we first present a graphical analysis of the responses.

A number of patterns emerge in Figure 9. Firms very rarely report concerns about the costs associated with LCs as a main driver for limiting the use of those facilities. At the same time, they seem interested in saving future borrowing capacity by restricting current usage of available LCs. To a lesser extent, companies also seem concerned with reputational costs associated with the use of funds from LCs.

For the most part, mean comparisons across size, ownership, ratings, and financing constraints categories fail to reveal significant systematic patterns in firms’ rationales to limit their use of LCs. The only exception is that firms that are larger and public are significantly more concerned about damaging their reputation in the credit markets with the use of their available LCs; that is, these companies limit their use of LCs in order to preserve their reputations. (The output of this test is

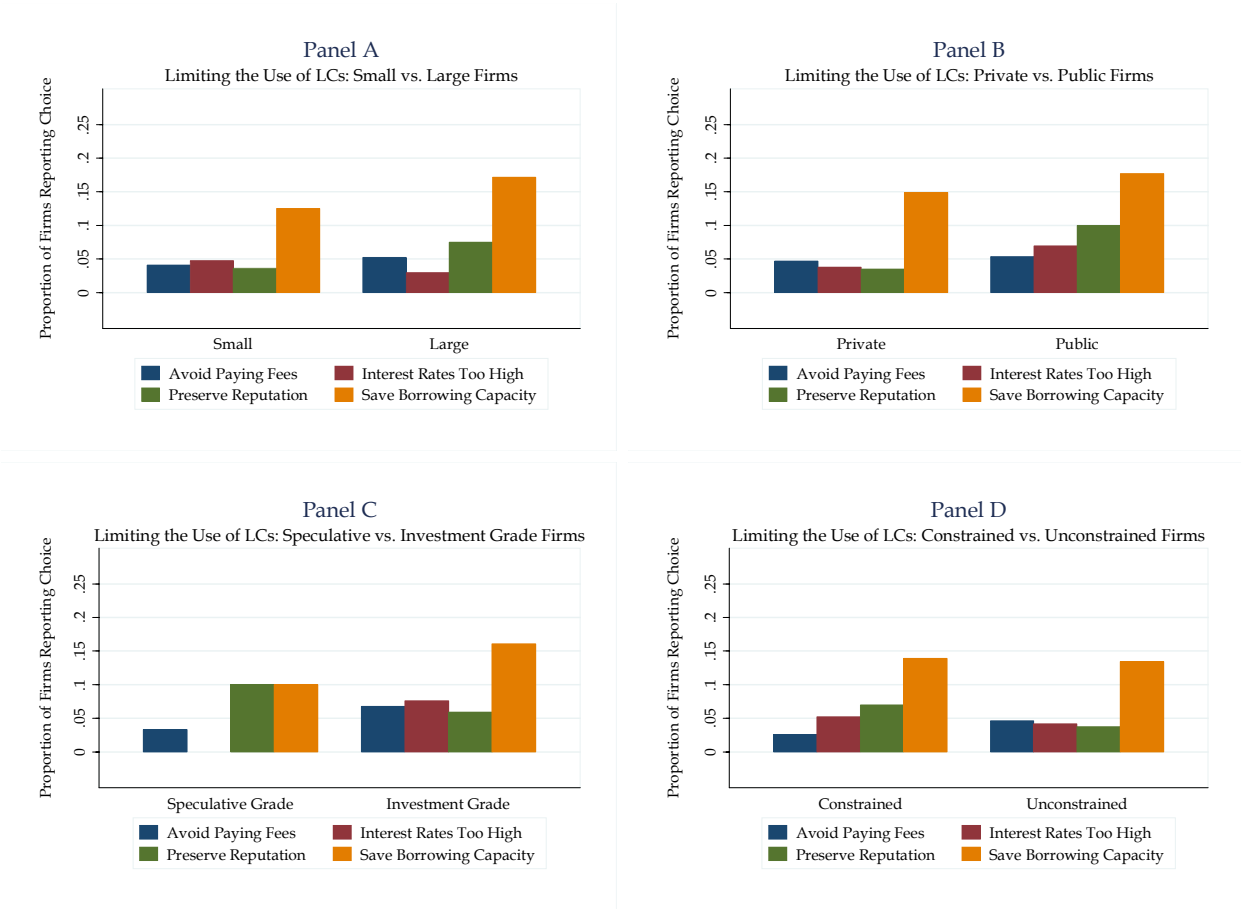


Figure 9: This figure displays firms’ LC management behavior (reasons for limiting the use of existing LCs). Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

omitted.) The patterns we observe in the U.S. are also observed in Europe. (Asian CFOs were not asked this question due to space and logistical limitations.)

### 5.3 Managing Derivatives

The financial crisis brought acute losses to a number of financial institutions in the U.S. Most notably, it led to the collapse of Lehman Brothers, which in the process negatively affected the market for derivative instruments. We were interested in learning about whether firms might change the way they manage derivatives following Lehman’s collapse. This is not an easy subject and we opted to ask managers whether Lehman’s collapse made them more cautious about counter-party risk in the derivatives markets. In answering this question, CFOs were offered three options: “as cautious as before,” “somewhat more cautious now,” “very much cautious now.” CFOs could also indicate that

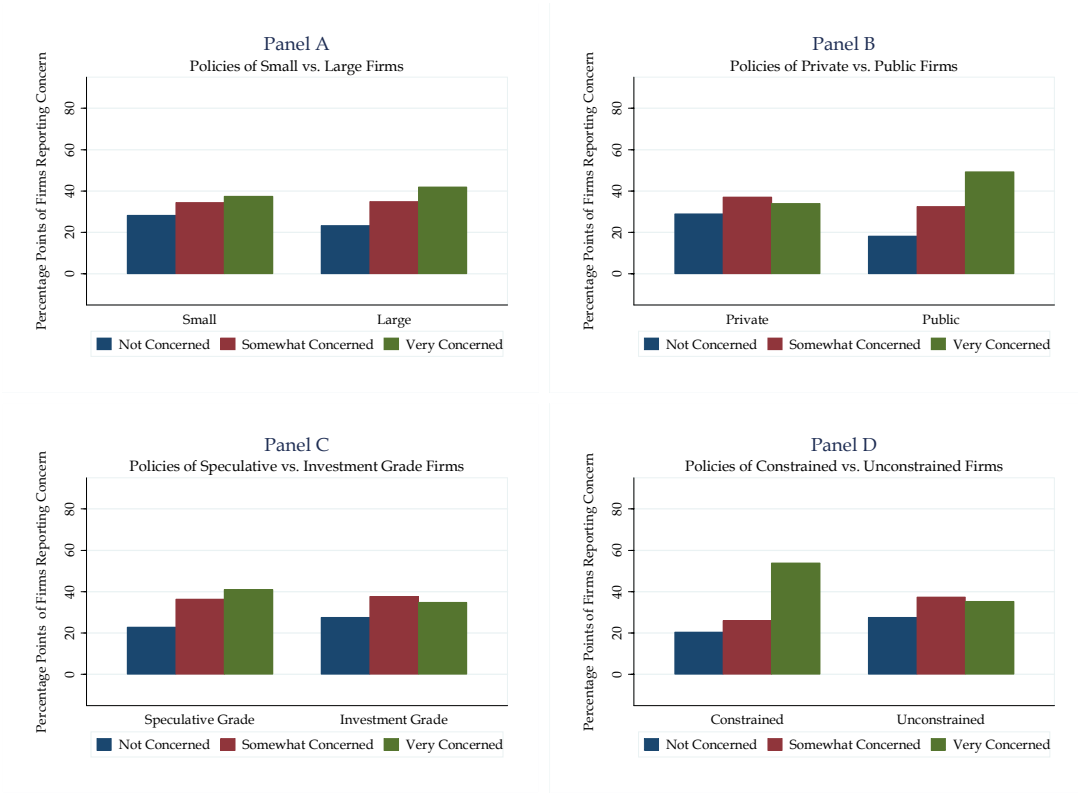


Figure 10: This figure displays the percentage of firms indicating how concerned they are about counter-party risk in the derivatives market since the collapse of Lehman Brothers. The analysis is conditioned on firms' participation in those markets. Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. For each partition, responses add up to 100%. See text for additional details.

they do not use derivatives. Nearly 40% of the firms in the sample characterized their concerns with counter-party risk in the derivatives market. We condition the analysis of their responses on having checked one of the mutually exclusive categories of concern. As a result, the numbers we report add up to 1. As before, we break down the analysis across four different categorizations. Figure 10 depicts the CFO responses.

Figure 10 suggests an increased level of concern among CFOs regarding counter-party risk in the derivatives markets following the collapse of Lehman Brothers. Only about one-in-five of the CFOs surveyed suggest that they are not particularly more concerned with counter-party risk in derivatives markets. In contrast, nearly 40% of the CFOs say that they are very concerned. The breakdown by firm type is interesting. About half of the public firms with dealings in derivatives say they are very concerned with counter-party risk now, compared to only one-fifth saying they are not more

concerned. Investment-grade firms are generally less concerned than firms with speculative-grade ratings. While we do not know who the counter-parties of these two types of firms are, one could imagine that speculative-grade firms may deal with riskier counter-parties (perhaps even Lehman) and that they may be the first to suffer (in terms of access) should the derivatives markets be further affected by risk concerns (not only regarding financial institutions, but also corporations in that market). A similar line of reasoning could apply to the cross-sectional differences we observe in terms of attitude towards counter-party risk across financially constrained and unconstrained firms.

Undoubtedly, more research is needed on the relation between perceived counter-party risk and market participation in derivatives. Since CFOs' attitude towards risk is key to this relation, future researchers should build on the findings presented here in trying to understand the determinants of corporate participation in those markets.

## **6 Investment Spending in a Financial Crisis**

Corporate executives and economic policy-makers are ultimately interested in the real-side implications of credit market imperfections. In other words, they worry about whether capital market frictions may trigger adverse effects on corporate investment, revenues, employment, asset growth, and acquisitions. The timeliness of our survey allows for unique insights into how corporate managers establish connections between the way the capital markets operate and how firms decide to invest.

### **6.1 Access to External Financing and Investment Distortion**

A well-known line of research examines whether constrained access to external funding sources affects the optimality of corporate investment. While many researchers agree that capital market imperfections can distort firm investment, others dispute the type of evidence used to support that claim. Much of the related research is based on archival financial statement data for public U.S. companies, and the econometrician has to ultimately estimate whether corporate managers make investment decisions that reflect difficulties in raising external funds. The existing evidence of a relation between investment distortions and capital markets frictions is only as good as the estimation method and the data (or proxies) used to back out that relation. In contrast to the existing approach, we obtain information about whether capital markets affect corporate investment directly from those in charge of making investment decisions. We do this via a series of questions in our survey.

We first ask each CFO to quantify the degree to which her firm's ability to access external financing limit the ability to fund positive NPV projects. The answer to this question tells us

whether the availability of financing — as opposed to the availability of investment opportunities — drives observed investment. This question is at the heart of the issue of whether financing frictions have consequences for investment efficiency. More generally, this tells us if problems in the organized capital markets can lead to serious consequences in the real economy.

We also ask that managers further qualify their answers by differentiating between difficulties in accessing external funds when credit markets are *operating normally* vis-à-vis the *current situation*, when credit markets are experiencing a severe crisis.

In answering the question about the effect of external financing on investment spending, managers are allowed check one of four possible answers: “no effect,” “small effect,” “moderate effect,” and “large effect.” For simplicity, we categorize these answers as follows: “no effect”/“small effect” = 0; “moderate effect”/“large effect” = 1. To gauge the relation between the answer to this question and the four classifications that we examine (size, ownership, ratings, and constraints), we average these 0–1 responses across the firms in each of our partitions.

We first discuss the answers pertaining to “normal times” (i.e., times other than the current crisis). Figure 11 suggests limited cross-sectional variation regarding how firms usually associate their access to capital markets and their ability to invest when we consider size and ownership classifications. Simply put, about one-in-four small, large, private, and public firms state that in normal times their access to the capital markets affects their ability to pursue profitable projects. Things are quite different when we consider credit ratings and our direct measure of financial constraints.<sup>7</sup> In particular, we observe that speculative and financially constrained companies report a markedly higher propensity to link the availability of external financing to the ability to pursue profitable projects; particularly more so when compared to investment-grade firms and financially unconstrained firms. These inferences are supported by mean comparison tests reported in Table 5.

We now examine CFOs’ views of this same issue in the midst of the 2008 credit crisis. We perform similar graphical and statistical analyses. Figure 12 resembles the equivalent figure for “normal times” in that there is limited variation regarding how companies associate their access to capital markets and their ability to invest based on size and ownership classifications. However, when we consider credit ratings and, especially, the self-reported measure of financial constraint, we find that speculative-rated firms and financially constrained firms report a much higher propensity to link the availability of external financing to the ability to pursue profitable projects. Indeed, 86%

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<sup>7</sup>It is worth noting that firms self-classify whether they are financially constrained in December 2008, but Figure 11 and Table 5 investigates behavior in normal times (i.e., not during Fall 2008).

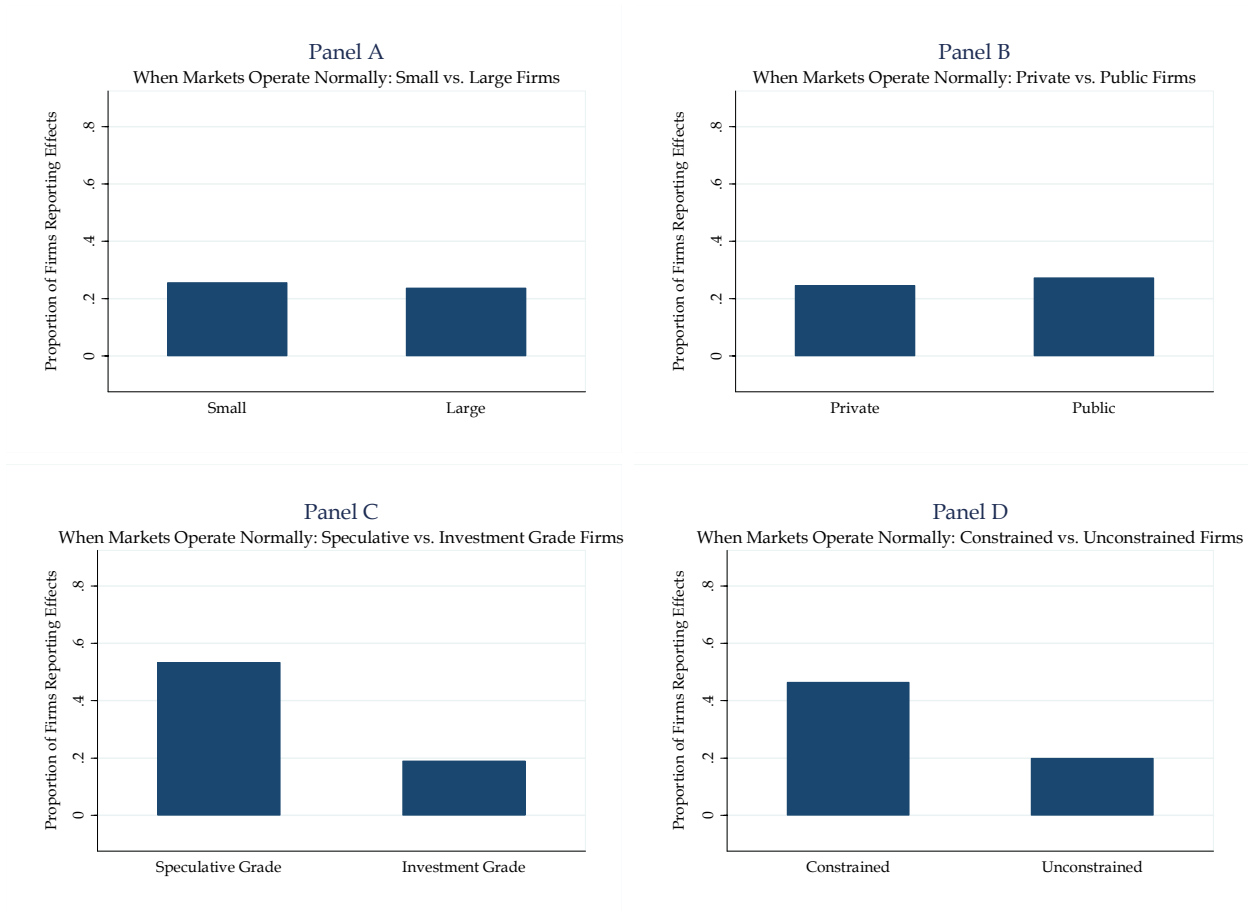


Figure 11: This figure displays the proportion of firms indicating that their ability to pursue profitable investment opportunities is linked to their ability to access external financing in “normal times.” Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

of financially constrained firms indicate that their ability to invest in positive NPV projects in the current period is tied to their ability to raise external funds in the capital markets. These inferences are supported by mean comparison tests reported in Table 6. The crisis exacerbates the degree to which firms link the availability of funds with the ability to pursue profitable opportunities. That is, the credit crisis highlights starkly how the availability of financing affects investment efficiency. Because a financial crisis drains credit from the financial markets, we get the unfortunate result that financial markets matter most for corporate investment precisely when they fail.

We cross-check our findings on the effect of the crisis on the relation between investment and financing by looking at data from Europe and Asia. The figures we obtain resemble those presented for the U.S., so we present the results more formally in a table that replicates the test contained in

**Table 5. The Effect of Credit Markets on Corporate Investment in Normal Times**

This table displays mean comparisons for the proportion of firms reporting that their ability to invest is conditioned by their access to the capital markets across different group categories (when markets operate normally). Category 1 groups firms that are small, private, speculative-grade rated, and financially constrained. Category 2 groups firms that are large, public, investment-grade rated, and financially unconstrained. The data is collected from the U.S. survey. *t*-Statistics in (parentheses).

Criteria	Category 1 “Constrained”	Category 2 “Unconstrained”	Diff. Categories
By Size	0.255*** (12.19)	0.236*** (6.241)	0.019 (0.43)
By Ownership	0.246*** (10.47)	0.272*** (6.81)	-0.026 (-0.58)
By Ratings	0.533*** (5.76)	0.190*** (5.19)	0.344*** (4.00)
By Fin. Const.	0.464*** (9.81)	0.200*** (10.53)	0.265*** (5.93)

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

Table 6. Panel A of Table 7 replicates our previous group mean comparisons using European data. Panel B uses data from the Asian responses.

The results from Europe and Asia provide strong support for the claim that the managers’ self-declared measure of constraint identifies quite well those firms whose investment decisions are particularly linked to their ability to obtain external financing during a credit crisis. Whereas in the U.S. some of this connection was captured by the ratings proxy, the same does not occur in non-U.S. markets.

## 6.2 The Relation between Investment and Internal Funding Sources

A question of much debate in the academic literature is the degree to which firms are able to use internally generated profits to fund investment when they face frictions in borrowing externally. Researchers have examined this question by looking at empirical correlations between investment and cash flows, reporting mixed results on the reliance of those correlations. Our survey data allow us to investigate this important issue. Again, we do so *directly*, asking managers if they use their firms’ internal resources in order to finance investment when access to credit markets is limited.

We compute the proportion of respondents checking each of the following options: “investment funded by cash flows,” “investment funded by cash holdings,” “investment funded by other (including partnerships),” and “investment is cancelled or postponed.” Respondents are allowed to check all

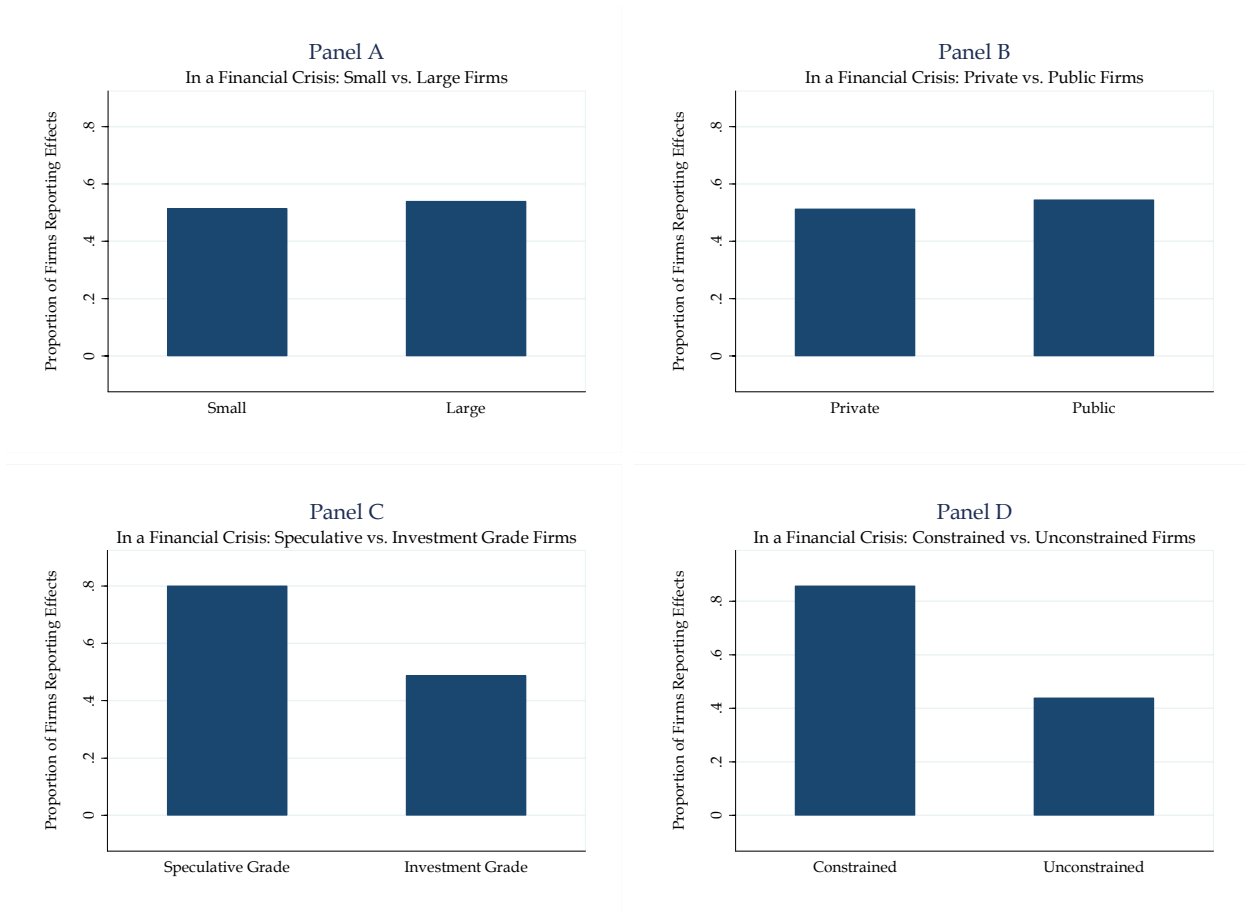


Figure 12: This figure displays the proportion of firms indicating that their ability to pursue profitable investment opportunities is linked to their ability to access external financing in “current times.” Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

options that apply, so that for each available category we use the following code: unchecked = 0 and checked = 1. We average these 0–1 responses across our four types of firm classification (size, ownership, ratings, and constraints). Figure 13 illustrates our findings using the U.S. data.

Figure 13 suggests that firms across *all* of the partitions that we consider are likely to use internal sources of funding (cash flows and cash stocks) for their investment when access to external capital markets is limited. The figure supports the notion that, in the face of a negative credit supply shock, companies do consider their internal resources (*both* operating income and savings) as a way to finance future investment. Likewise, firms across all categories indicate that they are likely to postpone or cancel investment plans when the capital markets tighten.

Some cross-sectional differences stand out in Figure 13. For instance, large, public, investment-

**Table 6. The Effect of Credit Markets on Corporate Investment during a Financial Crisis**

This table displays mean comparisons for the proportion of firms reporting that their ability to invest is conditioned by their access to the capital markets across different group categories (under the current market conditions). Category 1 groups firms that are small, private, speculative-grade rated, and financially constrained. Category 2 groups firms that are large, public, investment-grade rated, and financially unconstrained. The data is collected from the U.S. survey. *t*-Statistics in (parentheses).

Criteria	Category 1 “Constrained”	Category 2 “Unconstrained”	Diff. Categories
By Size	0.514*** (21.35)	0.539*** (12.19)	-0.25 (-0.50)
By Ownership	0.512*** (18.74)	0.544*** (12.16)	-0.032 (-0.61)
By Ratings	0.800*** (10.77)	0.487*** (10.41)	0.313*** (3.15)
By Fin. Const.	0.857*** (25.81)	0.438*** (18.61)	0.419*** (8.41)

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

rated, unconstrained firms indicate they are more likely to rely on cash reserves to finance future investment. This is in line with our previous findings that more constrained firms have already burned through a significant fraction of their internal cash reserves in recent months. The graphs also suggest that firms with low credit quality and those that are financially constrained show particularly strong propensities to cancel their investments. Indeed, nearly 56% of these companies indicate that they would cancel investment when external funding is limited, compared to about 30% of investment-rated and unconstrained firms. Assuming that firms prefer drawing on their cash reserves before cancelling their long-term investment plans (presumably, a costly course of action), we condition the decision to cancel investment on whether the firm indicates that it uses cash holdings to fund investment. For those constrained firms for which using internal cash is *not* an option, the rate of investment cancellation goes up to 71% (for unconstrained firms the rate goes up to 39%). To our knowledge, this dramatic finding is new to the literature. Critically, archival data does not allow for direct insights into whether investment is cancelled when access to credit markets becomes limited. In particular, the financial statement data used in prior studies only capture information relative to observed investment spending. That data limitation makes it difficult for one to fully understand the effective trade-off between investment and constrained financing.

**Table 7. The Effect of Credit Markets on Corporate Investment during a Financial Crisis – European and Asian Data**

This table displays mean comparisons for the proportion of firms reporting that their ability to invest is conditioned by their access to the capital markets across different group categories (under the current market conditions). The data is collected from the European and Asian surveys. Category 1 groups firms that are small, private, speculative-grade rated, and financially constrained. Category 2 groups firms that are large, public, investment-grade rated, and financially unconstrained. The data is collected from the European and Asian surveys. *t*-Statistics in (parentheses).

Criteria	Category 1 “Constrained”	Category 2 “Unconstrained”	Diff. Categories
Panel A: Europe			
By Size	0.352*** (8.12)	0.582*** (8.67)	-0.229*** (-2.91)
By Ownership	0.417*** (8.74)	0.452*** (7.09)	-0.035 (-0.44)
By Ratings	0.353*** (2.95)	0.400*** (5.72)	-0.047 (-0.34)
By Fin. Const.	0.800*** (9.80)	0.358*** (9.14)	0.442*** (4.34)
Panel B: Asia			
By Size	0.471*** (14.20)	0.523*** (6.86)	-0.051 (-0.62)
By Ownership	0.480*** (12.52)	0.483*** (8.96)	-0.003 (-0.05)
By Ratings	0.286 (1.55)	0.547*** (8.72)	-0.261 (-1.31)
By Fin. Const.	0.690*** (16.88)	0.293*** (7.59)	0.397*** (7.07)

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

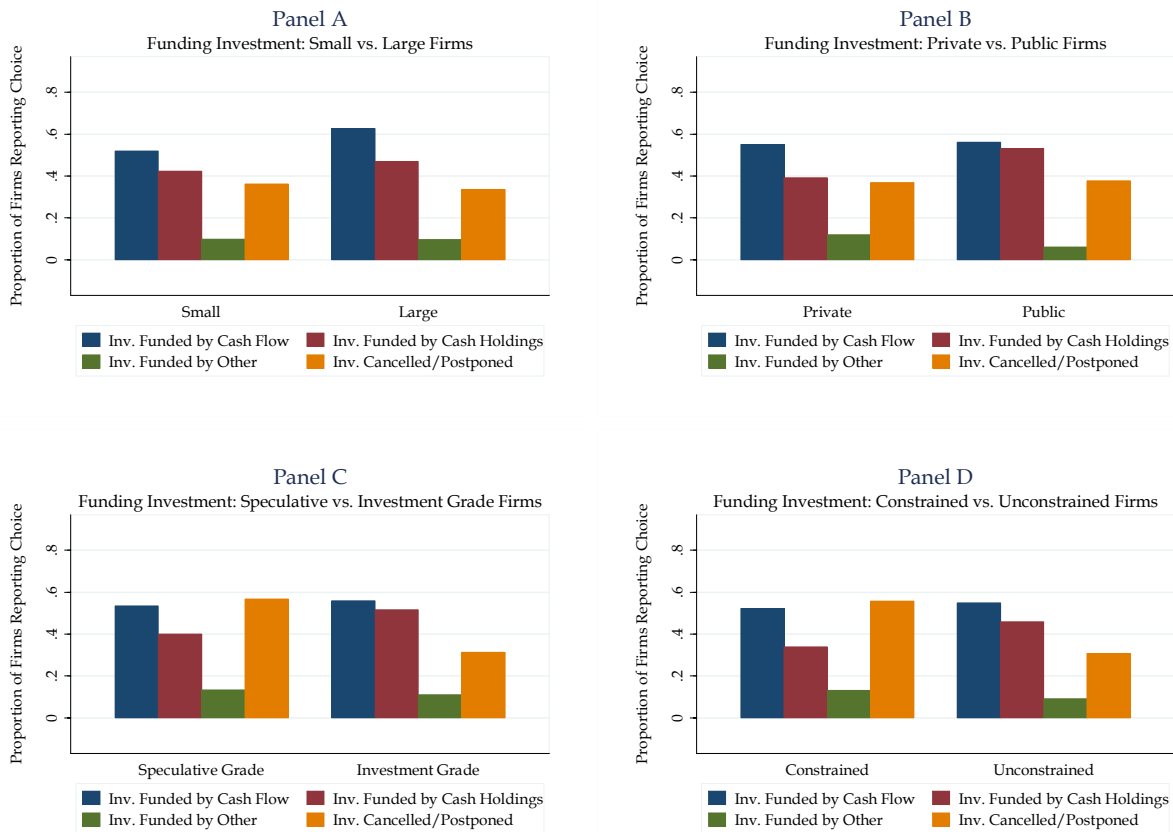


Figure 13: This figure displays the proportion of firms indicating how they fund their investment when external capital is limited. Responses are averaged across sample partitions based on size, ownership, credit ratings, and financial constraints. See text for additional details.

We check whether the inferences we gather from Figure 13 are statistically meaningful via means comparison tests. Table 8 reports those comparisons and the associated test statistics. The estimates in Table 8 show no significant cross-group differences in firms' propensity to use cash flows to fund investment when capital markets contract (the use of cash flows is equally high across all categories). The use of accumulated cash as an alternative is also widespread (significantly different from zero in all categories), but more pronounced in large, public, and unconstrained firms (in comparison to their small, private, and constrained counterparts). The degree to which firms that have low credit ratings or are financially constrained postpone or cancel investment is significantly larger (in economic and statistical terms) than that of other groups of firms — nearly 60% of these firms cancel investment when external funding is not available. These findings are confirmed when we look at CFO responses in our European and Asian surveys.

**Table 8. Credit Markets and the Funding of Investment**

This table displays mean comparisons for the proportion of firms reporting actions related to the funding or postponement of investment across different group categories. Category 1 groups firms that are small, private, speculative-grade rated, and financially constrained. Category 2 groups firms that are large, public, investment-grade rated, and financially unconstrained. The data is collected from the U.S. survey. *t*-Statistics in (parentheses).

Criteria	Policy	Category 1 “Constrained”	Category 2 “Unconstrained”	Diff Categories
By Size	Funded by Cash Flow	0.477*** (13.45)	0.567*** (8.78)	-0.089 (-1.21)
	Funded by Cash Holdings	0.387*** (11.18)	0.517*** (7.94)	-0.130* (-1.79)
	Funded by Other	0.116*** (5.09)	0.067** (2.05)	0.049 (1.09)
	Postponed/Cancelled	0.362*** (10.59)	0.283*** (4.83)	0.078 (1.12)
By Ownership	Funded by Cash Flow	0.550*** (20.40)	0.562*** (12.85)	-0.012 (-0.23)
	Funded by Cash Holdings	0.392*** (14.82)	0.531*** (12.08)	-0.139*** (-2.74)
	Funded by Other	0.120*** (6.82)	0.062*** (2.91)	0.058* (1.86)
	Postponed/Cancelled	0.368*** (14.10)	0.377*** (8.83)	-0.009 (-0.17)
By Ratings	Funded by Cash Flow	0.533*** (5.76)	0.559*** (12.19)	-0.026 (-0.25)
	Funded by Cash Holdings	0.400*** (4.40)	0.517*** (11.19)	-0.117 (-1.14)
	Funded by Other	0.133** (2.11)	0.110*** (3.81)	0.023 (0.35)
	Postponed/Cancelled	0.567*** (6.16)	0.314*** (7.31)	0.253*** (2.61)
By Fin. Const.	Funded by Cash Flow	0.522*** (11.15)	0.548*** (23.46)	-0.027 (-0.51)
	Funded by Cash Holdings	0.339*** (7.65)	0.458*** (19.57)	-0.119** (-2.31)
	Funded by Other	0.130*** (4.14)	0.090*** (6.71)	0.04 (1.29)
	Postponed/Cancelled	0.557*** (11.96)	0.306*** (14.14)	0.250*** (5.11)

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

**Table 9. Credit Markets and Corporate Asset Sales**

This table displays mean comparisons for the proportion of firms reporting that they are currently selling more assets than in previous years across group categories. Category 1 groups firms that are small, private, speculative-grade rated, and financially constrained. Category 2 groups firms that are large, public, investment-grade rated, and financially unconstrained. The data is collected from the U.S. survey. *t*-Statistics in (parentheses).

Criteria	Category 1 “Constrained”	Category 2 “Unconstrained”	Diff. Categories
By Size	0.476*** (9.72)	0.478*** (6.42)	-0.002 (-0.02)
By Ownership	0.489*** (9.23)	0.489*** (6.49)	-0.001 (-0.01)
By Ratings	0.588*** (4.78)	0.415*** (5.32)	0.174 (1.20)
By Fin. Const.	0.700*** (10.69)	0.366*** (7.60)	0.334*** (4.04)

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

Related to the question of whether firms may cancel investment plans due to credit constraints, we inquire whether they may *sell* existing assets because of financial constraints. Our survey asks managers whether they are currently selling more corporate assets than in previous years. The analysis of those responses, in Table 9, provides further insights into the real-side distortions of the credit crisis.

About one-third of the U.S. CFO respondents say they have either increased, kept constant, or decreased the sales of corporate assets in recent months. The number of respondents indicating that they will increase the sale of assets is averaged across firms classified within our four partition schemes. The mean comparisons reported in Table 9 reinforce the implication that our non-archival measure of financial constraints appears to capture more fully the severe effects of the credit crisis on corporate investment. Exactly 70% of the constrained respondents in our U.S. survey say that they are selling more assets now than before, compared to 37% of the unconstrained respondents, in order to obtain funds. The constrained/unconstrained contrast is the only treatment effect that captures significant cross-sectional variation in the degree to which different firms may have to sell assets to cope with the current financial crisis.

It is important that we highlight the novelty of our finding on the relation between investment spending and internal resources. Earlier researchers found a significant relation between investment and cash flows via the econometric estimation of simple investment equations (see Fazzari et al.

(1988)). Recent work, however, questions that evidence on the basis that model misspecification and poor data quality might introduce biases in the estimates of the sensitivity of investment to cash flows, biases that exaggerate that sensitivity (e.g., Gomes (2001)). Our approach is fundamentally different from that of the existing literature and it should be interpreted with this difference in mind. In essence, we completely bypass the need of a uniform investment model for all of the firms examined. We start from the premise that each CFO has his/her own “hard-to-specify” investment model, and instead of engaging in an econometric exercise that approximates that model, we gauge the importance of cash flows (and cash stocks) in firm’s investment decisions by simply asking the CFO about the role played by those funding sources. In sum, our evidence suggests that constraints to external financing are likely to increase the relation between a firm’s investment spending and its internal resources.

## 7 Summary and Conclusions

While the financial crisis of 2008 and the associated recession led to severe hardship, it also provided a historic opportunity to learn about the impact of financial constraints on corporate policies. Using a survey of 1,050 CFOs, we are able to directly identify the firms that are financially constrained. Combining our novel measure of constraints with an extraordinary financial crisis, we have a powerful test of the impact of financial constraints on real corporate actions.

Our research design offers a number of advantages over previous attempts to examine the impact of constraints. First, we collect information on corporate planning precisely when all firms in the economy are affected by an acute credit crisis. This exogenous, structural shift makes cross-sectional variation more informative. Second, past research has employed noisy proxies for financial constraints (such as firm size). In contrast, we measure whether a firm is constrained by directly asking its CFO (the person involved with decisions concerning investment spending and financing). We also collect information on the proxies that were used in prior research on financial constraints (size, ownership, credit ratings). We are able to show that our direct measure of constraint is associated with significant cross-sectional variation in both real and financial corporate policies during the crisis. At the same time, for the most part standard measures of constraints do not pin down meaningful associations between firm policies and the financial crisis. Third, our survey approach allows us to gather information that cannot be deduced from archival data. For example, we are able to gauge how the CFOs think about lines of credit, and how withdrawal policies impact their reputation with their bankers. We also learn about CFOs’ planned investments, cash management styles, and

savings strategies. Fourth we obtain synchronous data from other regions of the world. Those regions, too, suffer from the crisis, but their circumstances differ from that of the U.S., bringing additional (exogenous) variation to the relations we examine.

Our direct measure of financial constraint allows us to use simple methods to tease out first-order effects in the data. Using mean comparison tests, we show, for example, that financially constrained firms plan to cut more investment, R&D, marketing, and employment relative to financially unconstrained firms during the crisis. We also show that constrained firms are forced to burn a sizeable portion of their cash savings in crisis and to cut deeply into their dividend distribution policies. In contrast, unconstrained firms do not display this behavior. Among other results, we find that constrained firms guide the withdrawing of funds from their outstanding lines of credit according to concerns that their banks may restrict access to those lines. Unconstrained firms do not engage in this strategic behavior. In contrast, unconstrained firms avoid withdrawing funds from their lines of credit with the goal of preserving their reputation among banks and in the financial markets in general.

In perfect capital markets, all positive net present value projects are pursued. While it is well known that markets are not perfect, the more interesting question is how imperfect are they? Our results document a sharp dichotomy between constrained and unconstrained firms. Eighty-six percent of constrained firms say that financial constraints restrict their pursuit of valuable projects, and more than half of these firms are forced to cancel valuable investments. During the crisis, constrained firms also display a much higher propensity to sell off productive assets as a way to generate funds.

There are both short-term and long-term implications of our research. Our research indicates that the financial crisis systematically impacted real investment — but unequally across firms. Bypassing positive NPV projects reduces the chance of an economic recovery. In this context, we can understand why policy-makers undertook unprecedented actions to unfreeze credit markets. Looking beyond the crisis, our paper provides the sharpest evidence that financial constraints hamper investment in valuable projects. Relaxing these constraints produces additional long-term growth opportunities in the economy.

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