Financial policies and the financial crisis: Impaired credit channel or diminished demand for capital?

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Abstract

This paper examines the relative importance of three factors that affect the financial policies of firms during the financial crisis: 1) a contraction in credit supply; 2) a loss of investment opportunities; and 3) an increase in risk. Before September 2008, the evidence is not consistent with a dominant role for a contraction in credit supply. Small firms do not experience a decrease in net debt issuance in the first year of the crisis. In contrast, their net equity issuance is extremely low throughout the crisis, whereas an impaired credit supply by itself would have encouraged firms to increase their equity issuance. After September 2008, the evidence shows a dominant role for the increase in risk, but more so for large firms than small ones. Though small and unrated firms have exceptionally low net debt issuance at the peak of the crisis, large firms do not. Instead of decreasing their cash holdings, as would be expected with a temporarily impaired credit supply, large and investment grade firms increase their cash holdings sharply (by 17.8% in the case of investment-grade firms) from September 2008 to the end of our sample period. The fact that firms with no debt also decrease their net equity issuance and increase their cash holdings contradicts a credit channel explanation for the observed change in capital flows and cash accumulation.

The conventional view of the financial crisis is that bank losses from toxic assets led to fire sales and a credit contraction (see Brunnermeier (2009)).[1] These toxic assets were mostly securities backed by subprime and related mortgages, so their loss in value had little to do with the performance of industrial firms, making the credit contraction an exogenous event for these firms. Research in finance, including research on the recent financial crisis, shows that exogenous credit contractions have real effects on firms by forcing them to reduce investment.[2] However, a contraction in the supply of credit was not the only adverse development in the recent crisis. Investment opportunities disappeared and risk increased sharply. These factors led to a contraction in the demand for credit, so credit fell for reasons other than just the supply contraction. In this paper, we take one step back from directly studying the impact of the credit contraction on investment. Instead we investigate how firm financial policies differ during the financial crisis compared to normal times and what those differences tell us about the extent to which industrial firms were affected by an impaired credit supply versus a loss of investment opportunities and an increase in risk.

There is much evidence that financial policies depend on both financial market conditions and macroeconomic conditions (see references in Baker (2009), Erel, Julio, Kim and Weisbach (2010), and Korajczyk and Levi (2003)). Based on this evidence, we would expect firms to exploit advantageous conditions in credit markets and to increase their leverage when such conditions obtain. If the availability of credit becomes temporarily restricted, firms should borrow less. Further, with suddenly less welcoming credit markets, firms would use their cash holdings to finance investment since precautionary holdings of cash, whose importance has been emphasized in the literature (see, for instance, Opler, Pinkowitz, Stulz, and Williamson (1999)), exist precisely to mitigate the impact of adverse shocks. Finally, to the extent that a credit contraction is of an unprecedented magnitude, we would expect an unprecedented decrease in

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[1] See Boyson, Helwege, and Jindra (2010) for evidence showing that banks used a number of alternative mechanisms to increase their liquidity and capital during the crisis, so that the extent to which they did resort to fire sales and contracting credit because of toxic asset losses is not a settled issue.
[2] References to this large literature include work focused on the impact of monetary policy (e.g., Gertler and Gilchrist (1994)), Kashyap, Stein, and Wilcox (1993), and Kashyap, Lamont, and Stein (1994)) as well as more recent work focused on specific events associated with changes in the supply of credit (Leary (2009) and Lemmon and Roberts (2010)). Papers on the financial crisis are discussed later in this introduction.

net debt issuance. As credit becomes harder to obtain, firms should reduce their dividend payouts, repurchase less stock, and issue more equity (see Leary (2009) for evidence of the latter). In summary, we expect a credit supply shock to be accompanied by a drop in net debt issuance, by an increase in net equity issuance, by a drop in dividends and share repurchases, and by a decrease in cash holdings. We call this set of predictions the credit channel hypothesis.

Firms lost investment opportunities during the crisis for several reasons. The saliency of the crisis in financial markets makes it easy to forget that housing has always played a critical role in economic activity and that the housing sector was in recession before the financial crisis.[3] Further, it is well-known that oil price increases are a drag on economic activity and the price of oil increased sharply to a peak in 2008.[4] Finally, consumption fell sharply in 2008, especially during the last quarter. Campbell, Giglio, and Polk (2010) document that a feature of the financial crisis is a sharp decrease in corporate expected cash flows that takes place before September 2008. These events alone would result in a decrease in investment opportunities for firms. Further, these factors would lead to a decrease in the demand not only for debt financing, but also for equity financing. At least since Miller (1963), we know that equity issues are particularly sensitive to the business cycle. In particular, equity issues fall as stock prices fall. Thus the loss of investment opportunities would lead to a decrease in net debt issuance, a decrease in net equity issuance, an increase in dividends and equity repurchases, and a decrease in cash holdings. We refer to this scenario as the loss of investment opportunities hypothesis.

A striking feature of the recent crisis is the extent to which risk measures increased to unprecedented levels. For instance, the VIX reached levels never before seen. An increase in risk reduces the demand for risky assets by investors, which makes financing more expensive. Further, it provides incentives to firms to postpone investment and strengthen their balance sheet by hoarding cash (see, for instance, Bernanke (1983)). After the collapse of Fannie Mae, Freddie Mac, Lehman Brothers, AIG and Washington Mutual

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[3] Leamer (2007) concludes that "Of the components of GDP, residential investment offers by far the best early warning sign of a recession. Housing starts fell roughly by half from the end of 2005 to the end of 2007."

[4] Hamilton (2009) concludes that the U.S. would not have been in a recession during the period from the fourth quarter of 2007 to the third quarter of 2008 in the absence of the runup in oil prices.

in September of 2008, corporate executives and investors had genuine concerns about whether the financial system would still be functioning when they awoke the next day. There was also considerable uncertainty about government policy, given that Bear Stearns had been rescued but Lehman was allowed to fail. Pastor and Veronesi (2010) show that policy changes are accompanied by falling stock prices, increased volatility, and increased risk premia. When the chairman of the Federal Reserve System and the Secretary of the Treasury testified before Congress that the financial system was close to a collapse, corporate executives would have been foolish to ignore that information, even if it did not impress Congress enough initially to approve TARP. Economists describe the events that happened after August 2008 as a panic (Gorton (2010)). Whether or not the fear reaction was rational, it would not make sense to assume that business executives were unaffected and that this fear did not worsen the impact of the increase in risk. We would expect an increase in risk to increase a firm's cost of capital, making financing more costly. It would further decrease the liquidity of markets, which increases the cost of raising funds. Firms would seek stronger balance sheets, with more liquid assets. We would therefore expect an increase in risk to lead to a drop in net debt and net equity issuance, a drop in payouts, and an increase in cash holdings. We call this the risk hypothesis.

These three hypotheses are not mutually exclusive. All three effects could play a role during the crisis. Our focus is on whether the financial policies of industrial firms help us understand the relative importance of the three hypotheses. However, the importance of these hypotheses may differ across firm types. For instance, firms with no debt would not be affected by a temporary restriction to credit, and firms whose investment opportunities are already poor could not suffer much from a loss of investment opportunities. There is also no reason for the relative importance of these hypotheses to be constant throughout the crisis. It could be that one dominates at one stage and another at another stage. Finally, a caveat is necessary at this point. Though drawing sharp differences between our three hypotheses helps with the presentation, there are some relations among these hypotheses that blur their boundaries. For example, a restriction in the supply of capital that is expected to be long lasting could lead firms to invest in cash. Similarly, firms that expect the credit markets to be closed must still raise funds to pay off loans

or maturing debt issues. They would want to increase cash holdings for that purpose. These issues arise, however, if the impediments to the credit supply are expected to be more than temporary. With longer-term impediments to the credit supply, we would expect firms to issue even more equity. However, if firms invest in cash because of a longer-term restriction of the credit supply, we should not see similar investment in firms that have no debt. Another instance where we may draw the predictions too sharply is that firms may lose investment opportunities because of the increase in risk.

All three hypotheses predict a decrease in net debt issuance. Consequently, observing such a decrease does not enable us to make statements about the relative importance of these hypotheses. We must examine other financial policies to distinguish between the hypotheses. Since the credit supply shock, by itself, predicts an increase in net equity issuance while the other two effects predict a decrease in net equity issuance, net equity issuance makes it possible to assess whether the credit supply shock was the dominant effect. Further, loss of investment opportunities is the only hypothesis that predicts an increase in payouts, so the absence of an increase in payouts would be evidence against this effect being dominant. The risk hypothesis is the only one that predicts an increase in cash holdings. Finally, the recent literature has paid a great deal of attention to lines of credit. The credit supply shock predicts that firms draw down their lines of credit, but so does the risk hypothesis. The loss of investment opportunities hypothesis does not predict draw downs. The predictions of the three hypotheses are summarized in Table 1.

We investigate firm financial policies using quarterly data, which is the highest frequency corporate data available. Consequently, we must define quarters that correspond to the financial crisis. Early August of 2007 seems to be the consensus starting point of the crisis (e.g., Paulson (2010)). In our analysis, we are interested in the financial phase of the crisis, which we define as the period from the start of the third quarter of 2007 through the end of the first quarter of 2009. Though the crisis continues after the first quarter of 2009, financial markets start to stabilize such that at the end of the second quarter of 2009, both the stock market and credit spreads reflect better economic conditions than at the end of the first quarter of 2009. Specifically, the spread of the high yield Merrill Lynch index over intermediate term treasuries reaches its low point for 1983-2009 in the second quarter of 2007, increases to unprecedented levels after

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August 2008, and falls back to pre-September 2008 levels in the second quarter of 2009. The S&P 500 index reaches its lowest value in March 2009, but it rebounds sharply during the second quarter, so that the end of the first quarter of 2009 is the index's lowest end-of-quarter value during the crisis. For comparison, we consider the credit boom phase to extend from the beginning of 2005 through the second quarter of 2007.

We investigate the three hypotheses both for the whole sample and various subsamples. For the whole sample, we use asset-weighted as well as equally-weighted measures. Though equally-weighted averages are commonly used in corporate finance, they do not reflect the impact on the economy as a whole since these averages are dominated by small firms, and the assets of small firms represent a relatively small fraction of aggregate corporate assets. It is well-known from prior research (e.g., Bernanke (2007)) that the impact of a credit contraction should differ across firms of different sizes, since large firms are more likely to have access to public debt markets, while small firms rely more on bank financing.

To measure the extent of borrowing, we focus on two measures of net debt issuance. One measure is obtained from the cash flow statement and the other from the change in debt on the firm's balance sheet. The advantage of the second measure is that there are many different ways for firms to borrow and this measure includes all of them. Consequently, if one type of borrowing is especially restricted – say bank borrowing – it allows for the fact that firms have substitute forms of borrowing – for instance loans from institutional investors. Strikingly, aggregate net debt issuance in the first twelve months of the crisis is actually higher than during the last twelve months of the credit boom, and net equity issuance is about the same. This evidence is consistent with Chari, Christiano, and Kehoe (2008), who find that aggregate bank credit to firms does not fall in the first year of the crisis. As noted by Ivashina and Scharfstein (2010b), such evidence does not distinguish whether firms are receiving new loans or simply drawing down existing lines. However, in either case, firms' net debt financing is not lower. Aggregate cash to assets falls significantly in the first year of the crisis. However, this decrease is consistent with the behavior of the ratio in recent years before the crisis, when it was falling as well.

Slightly more than one year after the beginning of the crisis, markets were further disrupted by the events of September 2008. In the following, when we discuss financial policies after these events, we consider financial policies for the last quarter of 2008 and the first quarter of 2009.[5] After the September events, aggregate net debt issuance falls, but not to levels that are extreme outliers in the sample – strikingly, neither of the first two quarters after September 2008 has aggregate net debt issuance at or below the fifth percentile of the distribution of quarterly aggregate net debt issuance in our sample. In the aggregate, the drop in net debt issuance is more than offset by a reduction in equity repurchases. However, aggregate cash as a percent of assets (the cash ratio) increases by 1.30 percentage points in the two quarters following September 2008, a two-quarter increase unmatched since the start of our sample.

Though it is hard to find traces of an exceptional crisis before the events of September 2008 when investigating aggregate data, the impact of the crisis shows considerable heterogeneity across different firm types. Before September 2008, all but large and investment-grade firms decrease their cash ratio. Afterwards, all types of firms increase that ratio. The percentage increase in cash holdings after September 2008 is largest (14.4% on average) for investment-rated firms. Though net debt issuance for all firm types is similar in the first twelve months of the crisis and the last twelve months of the boom, the extent to which net debt issuance falls after September 2008 is inversely related to firm size and credit rating. Net debt issuance for small and unrated firms is lower in the first quarter of 2009 than in any quarter since the start of our sample in 1983; this finding does not apply to large and investment-grade firms. We would expect the least debt-dependent firms to be firms with no debt. Strikingly, these firms experience a substantial increase in their cash ratio after September 2008 as well, so the increase in cash holdings cannot simply be attributed to firms drawing down credit lines or to firms concerned about their ability to roll over existing debt.

No type of firm uses increased equity issuance to reduce the impact of a possible curtailment in credit availability. To the contrary, in the first year of the crisis small and unrated firms sharply reduce their net

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[5] One could argue, however, that the financial data for the end of the third quarter of 2008 already partly reflects the impact of the events of September 2008. By considering only the two quarters we do, our analysis is conservative and may ignore some of the impact of these events.

equity issuance before they decrease their net debt issuance. Further, from the start to the peak of the crisis, small firms have an average cumulative cash flow shortfall from the reduction in net equity issuance that is roughly twice the magnitude of the average cumulative cash flow shortfall from the reduction in net debt issuance. In contrast, net equity issuance for large firms is not different during the first twelve months of the crisis compared to the last twelve months of the boom. For these firms, the decrease in net debt issuance between the top of the boom and the peak of the crisis is less than the decrease in net repurchases; thus, the decrease in repurchases makes up for the lost cash from reduced net debt issuance.

After documenting the changes in financial policies during the credit boom and the financial crisis, we use pre-crisis models of cash, net debt issuance, and net equity issuance from the literature to investigate how these changes are explained by changes in firm fundamentals. We find that large and investment grade firms experience significant increases in abnormal cash holdings during the crisis, but small firms do not. All types of firms have significantly negative abnormal net debt issuance in each quarter after September 2008, but not before. However, the conclusion one reaches about net debt issuance depends crucially on the role allowed for credit spreads. Credit spreads began increasing in July 2007 and were very high after August 2008, so that allowing an impact for credit spreads is sufficient to explain the drop in net debt issuance. We estimate similar equations for net equity issuance. Unrated firms and the smallest firms have significantly negative abnormal net equity issuance throughout 2008 even though changes in fundamentals, by themselves, already explain a large drop in net equity issuance.

The evidence before September 2008 is largely consistent with the loss of investment opportunities hypothesis being dominant for small firms and with large firms being mostly unaffected. Small firms raise less equity and decrease their cash holdings. This decrease in net equity issuance is not consistent with a dominant impact of a credit contraction. Further, small firms do not experience a reduction in debt issuance during the first year of the crisis. After September 2008, the evidence for large firms is consistent with the risk effect dominating, as these firms hoard cash significantly. Small firms increase their cash to assets ratio, but mostly because their assets fall. They neither increase their net equity

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issuance nor decrease their cash to assets ratio, as would be expected with a pure credit supply shock. The lack of a decrease in the cash ratio is not consistent with a dominant impact of the loss of investment opportunities either. This suggests that the evidence for small firms is also consistent with a dominant impact of the increase in risk, but not sufficiently so to draw unambiguous conclusions.

Our evidence adds to an increasing literature on the implications of the financial crisis for industrial firms. This literature finds that the supply shock to credit associated with the financial crisis has an economically significant impact for some subsets of firms. In particular, using survey data, Campello, Graham, and Harvey (2010) provide evidence that firms that were credit constrained in 2008 reduce their spending plans, bypass attractive investment opportunities, and burn more cash. Almeida, Campello, Laranjeira and Weisbenner (2009) demonstrate that firms which had a substantial proportion of their long-term debt maturing immediately after the third quarter of 2007 reduce investment substantially in comparison to other firms. Campello, Giambona, Graham, and Harvey (2009) show that credit-constrained firms draw down credit lines during the crisis, but also face difficulties in renewing credit lines. The importance of credit lines is also emphasized by Ivashina and Scharfstein (2010a, 2010b), who provide evidence that firms draw down their credit lines after the September 2008 and hoard the funds drawn in cash Ivashina and Scharfstein (2010b) conclude that "the primary motivation behind the draw-downs was panic from the financial market uncertainty." Gao and Yun (2009) show that riskier firms experienced a sharp drop in commercial paper issuance for manufacturing firms. Duchin, Ozbas, and Sensoy (2010) find that firms with greater excess cash holdings at the beginning of the crisis reduce investment less early in the crisis but not later. They interpret their evidence as consistent with the existence of a supply shock to credit that is less costly for firms with excess cash. Iyer, Lopes, Peydró and Schoar (2010) find no credit supply reduction for large firms in Portugal, but find that younger firms with weak bank relationships are affected. Finally, Kuppuswamy and Villalonga (2010) show that the financial crisis had less of an impact on diversified firms.

The paper proceeds as follows. In Section 1, we introduce the dataset we use. In Section 2, we show how cash holdings, debt and equity issuance evolve during the credit boom and the financial crisis. In

Section 3, we contrast the evolution of financial policies across different types of firms. In Section 4, we use pre-crisis models of cash holdings, debt issues and equity issues to separate expected and unexpected changes in financial policies and to assess further how financial policies differ during the crisis. We discuss the interpretation of our results and conclude in Section 5.

Section 1. The sample

Most empirical work in corporate finance uses annual data. For our purpose, such data is unsuitable since it would force us to ignore how corporate financial policies change during the crisis and would make it impossible to examine the financial crisis from the top of the credit boom to the peak of the crisis which, as already discussed, we define as the first quarter of 2009. We therefore use quarterly data collected from the CRSP/Compustat Merged (CCM) Fundamentals Quarterly database for 1983-2009.

There are distinct problems with the use of quarterly data. First, many of the Compustat data items are only provided annually, so less detailed data is available on a quarterly basis than on a yearly basis. Second, many industries have seasonal factors. There is little we can do to deal with the lack of data availability, but we can address the seasonality issue. The first approach we use to address the seasonality issue is that we compare quarters to identical quarters in other years. The second approach is that we estimate models that specifically allow for seasonality.

In our investigation, we use issuance data from the cash flow statement. This is not the data typically used in the literature that focuses on security issuance to better understand firms' capital structure decisions. That literature typically considers changes in debt or equity above a threshold (see, for instance, Leary and Roberts (2005)) or considers only public issues (e.g., DeAngelo, DeAngelo, and Stulz (2010)). In this paper, we focus on the funding obtained by corporations from all sources, not just banks or public markets, since substitution across funding sources could help firms offset the impact of a bank credit contraction, for instance (for evidence of such substitution see Iyer, Lopes, Peydró and Schoar (2010)). We also focus on understanding whether financing flows are unusual, so that a net debt issuance close to zero for a class of firms is of interest to us if it is abnormally low.

The quarterly issuance data we need in our investigation is only available beginning in the third quarter of 1983. Consequently, our sample effectively starts from that quarter and ends with the first quarter of 2009. We delete observations with negative total assets (*atq*), negative sales (*saleq*), negative cash and marketable securities (*cheq*), cash and marketable securities greater than total assets, and firms not incorporated in the U.S. If a firm changes its fiscal-year end, and thus a given data quarter is reported twice in Compustat (for both the old fiscal quarter and the new fiscal quarter) we retain the observation for the new fiscal quarter only. Finally, we eliminate all financial firms, which we define as firms with SIC codes between 6000 and 6999; we also eliminate utilities, which we define as firms with SIC codes between 4900 and 4949.

Section 2. The aggregate evidence

At the start of the crisis, our sample includes 3,198 firms. When we divide firms listed on the NYSE into quintiles based on total assets and assign non-NYSE firms to these quintiles, we find that 2,021 of the 3,198 firms are smaller than the largest firm in the bottom quintile of NYSE firms. Consequently, at the beginning of the crisis, two-thirds of our firms are small firms with assets less than $715.7 million. The average and median assets for these firms are $196.6 million and $127.6 million, respectively. In contrast, the mean and median of assets are $31.9 billion and $16.1 billion, respectively, for the firms in the top quintile. We therefore examine the financial policies of firms in two different ways. First, we weight each firm by its assets. Second, we weight each firm equally. As we will see, results using the asset-weighted approach are strikingly different from the equally-weighted approach. Such differences occur when the experience of large firms differs from the experience of small firms, as equally-weighted results are dominated by small firms while asset-weighted results are dominated by large firms. At the end of the section, we examine the role of credit lines for a random sample.

Section 2.1. Asset-weighted results

Panel A of Table 2 shows the asset-weighted results from the first quarter of 2005 to the first quarter of 2009. We start with the asset-weighted ratio of cash to assets, where cash is cash and marketable securities (*cheq*). The cash ratio shows a u-shape during this period. It starts in 2005 with a value of 10.42%, falls to 9.49% at the top of the credit boom, and ends the period at 10.18%. Thus, at the peak of the financial crisis, firms hold more of their assets in the form of cash than at the start of the crisis. After the top of the credit boom, the ratio keeps falling and reaches its lowest point (8.89%) at the end of the third quarter of 2008. In the last two quarters alone, the cash ratio increases by 1.30 percentage points, representing an increase in cash holdings of 14.5%. There is no other two-quarter period in our sample where the cash ratio increases by more.[6] We assess the significance of these changes using two different approaches. The first approach (seasonality-adjusted p-values) is extremely conservative in that we compare the change of interest to changes over identical quarterly calendar periods to account for seasonality. For example, to investigate the statistical significance of the increase in cash holdings of 1.30 percentage points after September 2008, we use the distribution of two-quarter turn-of-the-year changes in cash holdings. This approach has low power since it uses only 26 two-quarter changes, but it fully adjusts for seasonality. The second approach (Newey-West p-values) uses all two-quarter changes but relies on Newey-West t-statistics to account for overlap. The 1.30 percentage point change over the last two quarters is significant irrespective of the approach we use. In contrast, the increase in cash holdings from the top of the boom to the peak of the crisis is only significant with the Newey-West t-statistic.

In the first year of the crisis, the cash ratio falls by 0.59 percentage points. One is tempted to conclude that firms react to the credit supply shock by consuming cash. However, such a conclusion does not withstand more careful study. To see why, note that from the fourth quarter of 2005 to the fourth quarter of 2006, a period of abundant credit, the cash ratio falls by much more, namely by 0.89 percentage points.

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[6] The next highest increase is 1.22 percentage points from Q3 1999 to Q1 2000. There was much concern about potential software problems at the turn of the century and this concern most likely explains this hoarding. Because cash holdings were lower at that time, the percentage change in cash is higher at the turn of the century (18.8%) than from 2008Q3 to 2009Q1 (14.5%).

A falling cash ratio is therefore not necessarily indicative of a recession or of a credit contraction. As discussed in Bates, Kahle, and Stulz (2009), we understand only partly why the cash holdings of industrial firms more than doubled since the early 1980s. That trend stops during the credit boom and cash holdings fall, but not drastically. The aggregate cash ratio peaks at 10.77% at the end of 2004; it then falls to 9.49% at the start of the crisis and bottoms out at 8.89% in the third quarter of 2008.

The next two columns examine net debt issuance. We use two measures to examine net debt issuance. For either measure, there is no difference between net debt issuance in the last twelve months of the credit boom and the first twelve months of the crisis. The first measure is obtained from the statement of cash flows and is calculated as long-term debt issuance (*dltisy*) minus long-term debt retirement (*dltry*) divided by lagged assets.[7] Strikingly, the highest net long-term debt issue ratio does not occur during the credit boom period, but in the last quarter of 2007. Though this ratio dips in the last quarter of 2008, it is always positive and rebounds in the first quarter of 2009 where its value is the same as at the top of the boom. In contrast, it has a negative value in the second quarter of 2005 – as well as in twelve other quarters before 2005. An obvious concern is that a relatively stable net debt issuance could mask large changes in long-term debt issuance. This is not the case. The second (and broader) measure of debt issuance, which we refer to as net total debt issuance and which includes short-term debt, is examined next. This measure is calculated from the balance sheet data and includes changes in both long-term debt (*dlttq*) and debt in current liabilities (*dlcq*) during the quarter. With this measure, we again see that the highest ratio is in the last quarter of 2007. The ratio falls steadily after the last quarter of 2007 and turns negative in the first quarter of 2009. Strikingly, however, there are six quarters since 1983 where this ratio has a lower value than in the first quarter of 2009. Consequently, the asset-weighted data does not support the notion that the crisis resulted in exceptionally low debt issuance; not only are the values that obtain during the crisis not the lowest in our sample period, they are not even in the bottom 5% of the distribution.

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[7] Many of the quarterly Compustat variables, including *dltis* and *dltry*, are reported on a year-to-date basis. For these variables, in the second, third, and fourth quarter of each fiscal year, the quarterly value is calculated by subtracting the lagged value from the current value.

We turn next to the aggregate ratio of net equity issuance to lagged assets, where net equity issuance is defined as aggregate equity issuance (*sstky*) minus aggregate equity repurchase (*prstkcy*). Equity issuance (not reported) falls sharply during the crisis. It averages 3.60% a quarter in the last year of the boom and 2.68% in the first year of the crisis. However, equity repurchases (not reported in table) decrease sharply as well. Equity repurchases reach a peak of 1.51% of assets in the third quarter of 2007 and fall to 0.31% of assets in the first quarter of 2009. Because of these offsetting effects, net equity issuance is similar in the last twelve months of the boom and the first twelve months of the crisis. The repurchase peak and trough coincide with the highs and lows of the stock market. Though we do not show dividends in the table, dividends to assets do not decrease during the crisis.

One could be concerned that the cash hoarding simply reflects firms saving cash by reducing capital expenditures in anticipation of a deep recession. The evidence is not consistent with this hypothesis for the last quarter of 2008; in that quarter there is no evidence that capital expenditures or R&D decrease (R&D not reported in table). Capital expenditures as a percent of assets are higher in 2008 than in 2005. In addition, capital expenditures in each quarter of 2008 are roughly the same as in the corresponding quarter in 2007. Though capital expenditures fall in the first quarter of 2009, so do operating cash flows. Our measure of operating cash flow represents the cash flow available for discretionary investment and is calculated following the approach of Minton and Schrand (1999) (see Appendix for details). Operating cash flow has a pronounced seasonal component, and is generally much lower in the first quarter. However, operating cash flow is lower in the first quarter of 2009 than in the first quarter of 2008 and the decrease in operating cash flow is significant when using the seasonality adjusted p-value. Operating cash flow in the last quarter of 2008 is hardly distinguishable from the previous quarters.

Section 2.2. Equally-weighted results

We now turn to the equally-weighted results provided in Panel B of Table 2. While in the aggregate results we require that firms have data for all variables so that the denominator of the ratios is the same, for the equally-weighted results we construct averages for each variable separately and only require data

for that variable. The number of observations reported is the number of firms for which we have cash and assets data. We winsorize the equally-weighted results at the 1% and 99% levels, however, to mitigate the influence of outliers. Firms decrease their cash to assets ratio by 1.1 percentage points from the first quarter of 2005 to the top of the boom. The magnitude is similar to the 1.3 percentage point drop for the asset-weighted results. However, instead of a u-shape pattern of cash holdings, the cash ratio falls from the top of the boom to the peak of the crisis by 1.78 percentage points. When examining the asset-weighted results, we noted that the cash ratio falls more during 2006 than it does in the first year of the crisis. This is clearly not the case for the equally-weighted ratio. This ratio increases by 0.58 percentage points after September 2008. In evaluating significance, we report p-values for paired t-tests using the firms that exist in the third quarter of 2008 and the first quarter of 2009. For these firms, the cash ratio increases by 0.70 percentage points, which is statistically significant at the 1% level. The evidence is consistent with the view that small firms use their precautionary cash holdings to cope with adverse shocks. This behavior does not show up in aggregate data because, while there are many small firms, their weight in the asset-weighted average is small.

The story of net debt issuance differs substantially after September 2008 when we examine the equally-weighted average instead of the asset-weighted average. During the first twelve months of the crisis, net debt issuance is the same as during the last twelve months of the credit boom, irrespective of the measure of net debt issuance used. However, net debt issuance collapses after September 2008 when examining the equally-weighted results. For both measures of net debt issuance, we find that net debt issuance is negative in the two quarters after September 2008, i.e. firms are repaying debt on net rather than borrowing. Further, the net total debt issuance measure (that includes short-term debt) reaches its lowest value during our sample period in the first quarter of 2009, and the net long-term debt issuance measure reaches its second lowest value in that quarter.

In contrast to net debt issuance, net equity issuance falls sharply in the first year of the crisis. In the last twelve months of the boom, net equity issuance is roughly 1% per quarter; it drops to 0.5% in the first twelve months of the crisis. Strikingly, it turns negative in the last quarter of 2008, albeit by a small

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amount – this is the only quarter in our sample where equally-weighted net equity issuance is negative. In contrast, asset-weighted net equity issuance is typically negative because large firms repurchase more equity than they issue. The evidence is inconsistent with the view that the dominant effect was a curtailment of credit. Firms did not substitute equity issuance for debt issuance. Instead, equity issuance drops substantially before debt issuance drops.

The cumulative shortfall in financing cash flow from the decrease in net equity issuance for the equally-weighted results is on average more than double the cumulative shortfall from the reduction in net debt issuance. To see this, suppose that from the start of the crisis to its peak, firms continued issuing equity at the same rate as in the last quarter of the credit boom. Over these seven quarters, firms would have issued equity corresponding to approximately 9.94% of assets.[8] Instead, they issue equity corresponding to 2.50% of assets, for a shortfall of 7.44% of assets. In contrast, had firms kept issuing debt at the same rate as they did in the last quarter of the credit boom, they would have issued debt equal to approximately 7.35% of assets. Instead, they issue debt equal to 3.79% of assets, for a shortfall of 3.56% of asset.

In sum, there are striking differences between the asset-weighted and equally-weighted averages. The cash ratio increases from the top of the boom to the peak of the crisis for the asset-weighted average but falls for the equally-weighted average. In the aggregate, net debt issuance is not affected by the crisis in the first twelve months and does not have extreme values in the two quarters after September 2008. However, with equally-weighted averages, debt issuance collapses after September 2008. Yet, strikingly, while equally-weighted debt issuance is unaffected in the first twelve months of the crisis, equally-weighted equity issuance falls by more than half during this period; in contrast, it stays unchanged for the asset-weighted average. This evidence suggests that financial policies evolved in sharply different ways for large and small firms during the financial crisis and that the financial crisis affected large and small firms in a markedly different way, a finding that is reminiscent of the conclusion of Bernanke (1983) that

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[8] Note that, for simplicity, we use actual assets in these computations rather than what the assets would have been had equity issuance or debt issuance been different.

small firms bore the brunt of the Great Depression. If a drop in the supply of credit was the major impact of the crisis, we should see these firms try to raise funds through equity to replace the missing credit; this did not happen. In fact, they reduce their equity issuance before there is any trace of a decrease in debt issuance. This evidence is consistent with a dominant impact of the loss of investment opportunities and the increase in risk, rather than a dominant impact of the exogenous shock to the credit supply.

The patterns observed after September 2008 cannot be observed in the recession of 1990-1991, which was also associated with a credit crunch. With that recession, there are only trivial changes in the asset-weighted and equally-weighted averages of the cash ratio. More specifically, the aggregate cash ratio falls by 0.06 percentage points from the third quarter of 1990 to the first quarter of 1991 and the equally-weighted average increases by 0.03 percentage points. Nothing like the post-September 2008 increase in cash holdings takes place in that recession. Such an increase does occur in the 2001 recession, which was not associated with a credit crunch. In that recession, the aggregate cash ratio increases by 0.62 percentage points and the equal-weighted cash ratio increases by 1.58 percentage points. However, just about all of the increase in the cash ratio takes place after September 11. The only other dramatic two-quarter increase in cash is from the third quarter of 1999 to the first quarter of 2000, when there was concern about the impact of passing the millennium mark on the functioning of computers.

One concern is that our results could be influenced by the changing composition of the sample as firms cease to exist. Consequently, in untabulated results, we construct a sample of firms that exist continuously from the end of the first quarter of 2007 to the end of the first quarter of 2009. There are 2,547 firms that satisfy this requirement. The change in the aggregate cash ratio after September 2008 for these firms is 1.47 percentage points as compared to 1.30 percentage points for the whole sample of firms. All the other patterns we discuss exist for these firms. We also verify that the dollar amount of cash holdings increases as well and find that, over the crisis, the aggregate dollar amount of cash held by firms that are continuously in existence increases by roughly $100 billion from the top of the boom to the peak of the crisis. For the whole sample, cash holdings increase by $89 billion in the two quarters after September 2008. We also investigate the medians for the sample used for the equally-weighted average.

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We find an increase in the median cash ratio after September 2008 of 0.91 percentage points, compared to the mean change of 0.58 percentage points.

Section 2.3. Lines of Credit

As discussed in our review of the literature, much attention has been paid to the role of credit lines and credit line draw-downs during the financial crisis. Using the approach of Sufi (2009), we construct a random sample of 300 firms as of the second quarter of 2007 to examine the economic importance of credit line draw-downs for firms meeting our sampling criteria. We then obtain data on lines of credit available and draw-downs from 10-Qs and 10-Ks. Table 3 shows data for the asset-weighted sample and the equally-weighted sample.

Not surprisingly, given the existing literature, many firms have access to credit lines. Out of our 300 firms, 243 or 81% have credit lines at the start of the crisis. Columns 4-6 examine only those firms in each quarter that have existing lines of credit. Column 4 shows that the percentage of firms with credit lines having new draw-downs peaks in the fourth quarter of 2007 at 37.28%. The next column shows the percentage of new draw-downs in each quarter as a percentage of the total line of credit. This amount also peaks in the fourth quarter of 2007. Column 6 shows the ratio of total draw-downs outstanding as a fraction of the total line of credit. This fraction increases the most in the last quarter of 2007. The increase in the last quarter of 2008 is only 1 percent. Our results for the average total draw-down outstanding to total line of credit are higher throughout the crisis compared to the estimates in Ivashina and Scharfstein (2010b). In their sample, the percentage drawn increases by 3.81% (from 20.04% to 23.85%) in the third quarter of 2008 but falls in the fourth quarter to 23.30%. We do not observe such an increase in the third quarter of 2008. However, our sample selection procedure is different. Their sample includes only manufacturing firms that have revolving lines before the crisis and still outstanding in the fourth quarter of 2008. Our sample makes no such requirements: It only requires firms to be in existence before the crisis and is chosen randomly from more than 3,000 firms in Compustat. These sample differences could well explain the differences in results.

In columns 7-10 of Table 3, we examine the importance of credit lines and credit lines draw-downs using asset-weighted averages and equally-weighted averages. Looking first at the asset-weighted sample, we find that the ratio of total lines of credit to total assets is 9.5% at the start of the crisis. The aggregate amount of new draw-downs per quarter divided by total assets is less than 1% of assets in all quarters except one, the fourth quarter of 2007, when it is 1.28%. Yet, during that quarter, in untabulated results, the ratio of cash holdings to total assets for our random sample falls. New draw-downs in the last two quarters are much lower than in the fourth quarter of 2007. We turn next to the equally-weighted results. In our equally-weighted sample, credit lines represent 15.0% of assets in the sample formation quarter, which is not very different from the 16.5% in the Sufi (2009) sample or from the data collected by Gao and Yun (2009) for manufacturing firms in 2008. The equally-weighted average of the new draw-downs in the fourth quarter of 2007 is 1.72%. It is much lower in the fourth quarter of 2008, when it is 1.03%. This percentage drawdown is similar to the percentage drawdown in the first quarter of 2008. This evidence on draw-downs seems consistent with both the credit channel hypothesis and the risk hypothesis.

Section 3. Evidence for size, ratings, financially constrained and zero debt subsamples

The contrast between the equally-weighted results and the asset-weighted results shows that financial policies of small and large firms evolve very differently during the financial crisis. To investigate this heterogeneity further, we turn to several subsamples. First, we consider firms of different sizes. Second, we examine financial policies of firms that differ in credit ratings – either the level or the existence of one. Third, we report results for firms that are financially constrained versus unconstrained immediately before the crisis, according to a modified version of the definition of Korajczyk and Levi (2003). Finally, we discuss results for a sample of firms with no debt.

Section 3.1. Size groups

We first examine the financial policies of firms by size. We divide the NYSE firms into five quintiles based on assets at the beginning of the quarter. We then assign the non-NYSE firms to these quintiles. Panel A of Table 4 provides data for the smallest and largest size quintiles, detailing changes in financial policies and the significance of these changes from pre- to post-crisis and pre- to post-September 2008. Figure 1 shows the evolution of the equally-weighted average cash ratio for all size quintiles. In this figure, we normalize the ratio to one at the start of 2005 for all size quintiles. It is immediately apparent that the experience of firms is quite different depending on their size. Firms in the three top quintiles decrease cash throughout the boom period and continue to do so until at least the first quarter of 2008. However, the cash ratio increases after September 2008; the increase is especially sharp for the third and fifth quintile. In contrast, the two quintiles of the smallest firms have a substantially different experience. The decrease in the cash ratio for these firms during the boom period is minimal. However, they decrease their cash ratio sharply during the first year of the financial crisis, and increase it less, but nevertheless significantly, during the two quarters following September 2008.

We turn to net debt issuance next. Figure 2 shows the evolution of the broad measure of net total debt issuance for the five size quintiles. It is apparent for all size quintiles that there is no clear change from before the peak of the credit boom to the first year of the financial crisis. However, net debt issuance falls dramatically after September 2008 and turns negative for all size groups except the largest firms, whose net debt issuance is essentially zero in the last quarter of the sample. For the four smallest size quintiles, the low net debt issuance after September 2008 is lower than the lowest net debt issuance experienced during the boom. In contrast, for the largest firms, the net debt issuance for the first quarter of 2009 is actually higher than the net debt issuance in the first quarter of the boom period. Over our entire sample period, the four smallest size quintiles never experience a net debt issuance rate lower than the one they experience in the first quarter of 2009. Since small firms rely much more on bank loans than large firms, our evidence is consistent with the evidence in Becker and Ivashina (2010) of a serious supply shock to

bank debt in 2009. However, the situation of the largest firms is different; they experience lower net debt issuance in 18 quarters during the sample period.

Figure 3 shows net equity issuance for the size quintiles. Equity issues are a major source of financing for small firms. They have positive net equity issuance while the other size groups have negative net issuance – i.e., they buy back more equity than they issue. In fact, in the four quarters before the start of the crisis, Panel A of Table 4 shows that small firms raise an average of 1.90% of assets in net equity and 0.83% of assets in net debt each quarter. In the first four quarters of the crisis, net equity issuance falls to 1.12% while net debt issuance remains unchanged at 0.83%. For the other size groups, net equity issuance increases in 2008, but mostly because repurchases fall. Only in the last two quarters of the sample do the other size groups experience net equity issuance ratios that are higher than the highest experienced during the credit boom. In contrast, net equity issuance by small firms plunges in early 2008. For three quarters in 2008 and the first quarter in 2009, small firms have the lowest net equity issuance of any quarter in our sample. In 2008, only the second quarter has net equity issuance higher – but only slightly so – than the lowest net equity issuance of our sample before the crisis – and that quarter is the fourth quarter of 1990.

The evidence in this section suggests that the credit supply shock is not the dominant effect in the first year of the crisis. Though small firms consume cash, which is consistent with a shock to the credit supply, their equity issuance falls dramatically while their net debt issuance does not fall initially. This fall in net equity issuance is consistent with decreased investment opportunities and greater risk. For large firms, there are no significant changes in the first year of the crisis. However, after that, repurchases drop, net debt issuance drops, and cash increases. The drop in repurchases is not consistent with a dominant effect for the loss of investment opportunities. However, a dominant risk effect would lead to the changes observed after September 2008.

Section 3.2. Credit rating groups

In Panel B of Table 4, we turn to subsets of our sample based on credit ratings. We divide firms quarterly into firms with an investment grade rating, a speculative rating, and no rating using the S&P long-term rating (*splticrm*) available on Compustat. The results are striking. Investment grade firms, as shown in Figure 4, have a higher cash ratio at the peak of the crisis than at the beginning of the crisis. Their cash ratio increases by 1.43 percentage points, from 8.04% to 9.47%. Another way to put this is that, measured as a fraction of assets, their cash at the peak of the crisis is 17.8% higher than at the beginning of the crisis. Almost all of the increase in cash takes place in the last two quarters – cash as a percent of assets increases by 1.19 percentage points in the last two quarters. Investment grade firms raise funds through debt each quarter, though in the last quarter the net debt issuance is a trivial 0.01%. They also are net repurchasers of equity throughout the crisis.

When we examine speculative grade firms, the increase in cash throughout the crisis is only 0.27 percentage points. However, the increase from the end of the third quarter of 2008 to the end of the first quarter of 2009 is 0.83 percentage points. Debt issuance is negative for these firms in the last two quarters of the sample. Speculative-grade firms raise equity on net each quarter, but the amount is very small after September 2008. The drop in equity net issuance for the speculative-grade firms is much less than the drop in net debt issuance. Further, for these firms, the drop in net debt issuance is already significant in the first year of the crisis in contrast to all other subsamples of firms considered.

Finally, non-rated firms have a dramatically different experience from the firms with a rating and hence with access to public markets; this further supports the conclusion of Faulkender and Petersen (2006) that access to public debt markets has an important impact on firm financial policies. The cash ratio of these firms is 26.77% at the start of the crisis, which is almost the same as the ratio (27.67%) at the beginning of 2005. At the bottom of the crisis, the cash ratio drops to 24.14%, so their cash ratio falls by 2.63 percentage points relative to the start of the crisis. However, these firms increase their cash holdings after the third quarter of 2008 as well. The unrated firms issue debt on net in every quarter except for the last two. The net debt issuance of these firms is actually larger in the first year of the crisis

than in the last year of the boom – an average of 0.69% per quarter in the last year of the boom versus 0.83% in the first year of the crisis. In contrast, net equity issuance falls from an average of 1.52% to 0.80% from the last four quarters of the boom to the first four quarters of the crisis.

Section 3.3. Financially constrained firms

It is not uncommon in the literature to define financially constrained firms as small firms or firms without a credit rating.[9] Panels A and B of Table 4 show that both types of firms decrease their cash holdings during the financial crisis, but nevertheless experience an increase in cash holdings after September 2008. We also compare cash holdings using an alternative definition of financial constraint, based on a modified version of Korajczyk and Levi (2003). In particular, we examine firms at the top of the credit boom (the second quarter of 2007) and define a firm to be financially constrained if it (1) does not pay dividends, (2) does not have net equity repurchases, (3) does not have a credit rating, and (4) has a Tobin's q greater than one (defined as the market value of the assets divided by the book value, where market value of assets is book value minus book equity plus market value of equity). With this definition of financial constraint, we attempt to isolate firms that have investment opportunities that outpace their internally generated cash flow and that do not have access to public debt markets. The results are in Panel C of Table 4. We find that constrained firms have an average cash ratio of 35.77% at the end of the credit boom. The cash ratio of these firms falls sharply during the crisis, to 31.09% at the peak of the crisis. Yet, the cash ratio of these firms increases after September 2008 by 0.36 percentage points on average. Before the crisis, these firms are large issuers of equity and their average net equity issuance dwarfs their average net debt issuance. In the second quarter of 2007, their equity sales amount to 3.13% of assets. Equity sales are sharply lower in 2008 and early 2009. In the last quarter of 2008, they equal 0.55%. Since the capital expenditures of these firms stay unchanged in the first year of the crisis, firms must be using their cash holdings to offset the decrease in equity sales. Finally, the net debt issuance of constrained firms is much lower in the third quarter of 2008 than in the last quarter of the boom. However, the drop in net equity

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[9] See, for instance, Almeida, Campello and Weisbach (2004).

issuance is even larger. Part of the drop in net equity issuance is due to the fact that net equity issuance in the second quarter of 2007 was unusually high. However, accounting for that, the drop in net equity issuance is still large and its cumulative impact is greater than the impact of the drop in net debt issuance, a fact that is inconsistent with a dominant impact of the credit supply shock. Unconstrained firms experience a decrease in the cash ratio during the crisis as well, but they have a much larger increase in their cash ratio after September 2008, when their cash ratio increases by 0.73 percentage points, from 14.99% to 15.72%.

Section 3.4. Zero debt groups

To better understand the role of debt in the evolution of firm financial policies during the crisis, we construct two samples of firms that have no debt, which we define as firms whose leverage ratio equals zero. We do not tabulate the results. The first sample is composed of firms that have zero leverage at the start of a quarter. These firms could borrow during that quarter and end the quarter with debt. We would expect the financial policies of such firms to be the least affected by changes in the credit markets among the subsamples we have considered. These firms have an extremely high cash ratio of 41.95% at the end of the credit boom. The cash ratio of these firms falls to 38.32% at the end of the third quarter of 2008. However, these firms hoard cash after September 2008, as their cash ratio increases to 40.27% by the end of our sample; this increase of 1.96 percentage points is the largest percentage point increase among the subsamples we have considered. This increase of 10.70% in cash holdings is statistically significant. Further, these firms experience a dramatic decrease in net equity issuance. Strikingly, net equity issuance for these firms as a percentage of assets is 2.05% in the last quarter of the credit boom. Yet, it is negative for each quarter in 2008. Prior to 2008, net equity issuance for firms with no debt is negative in only one quarter in our sample, the third quarter of 2002. There are no consecutive quarters with negative net equity issuance for such firms before 2008. This evidence makes it implausible that somehow the drop in net equity issuance is an indirect result of difficulties a firm would have in raising debt.

Our second zero leverage sample consists of firms that have no debt at the end of the quarter. Obviously, this creates a bias in the results. However, the point of this sample is to consider firms that do not increase their cash because of debt issuance. Because these firms have no debt at the end of the quarter, they typically have negative net debt issuance during the quarter. These firms experience a 1.19 percentage point increase in the cash ratio after the events of September 2008. This increase is statistically significant as well and represents a 15.38% increase in cash holdings. It follows that the increase in cash holdings is not tied to credit line draw-downs. These firms also experience a dramatic drop in net equity issuance.

Section 3.5. Sources of changes in the cash to assets ratio

To better understand why the cash ratio changes, we decompose the change in the cash ratio using a first-order approximation as follows:

$$\frac{C(t)}{A(t)} - \frac{C(t-1)}{A(t-1)} = \frac{C(t) - C(t-1)}{A(t-1)} - \frac{A(t) - A(t-1)}{A(t-1)} * \frac{C(t-1)}{A(t-1)} + approximation\ error$$

where C(t) is cash at date t and A(t) corresponds to assets at date t. This decomposition shows that if assets fall sufficiently, the cash ratio can increase even though cash holdings fall. We compute the ratios [C(t)-C(t-1)]/A(t-1) and [A(t)-A(t-1)]/A(t-1) for all of our subsamples. Strikingly, changes in cash are negative for the equally-weighted ratio but not for the asset-weighted ratio in the fourth quarter of 2008. However, for the equally-weighted ratio, the asset growth ratio is also negative, so that that the value of assets falls. It turns out that the negative change in cash is driven by the smallest firms and the unrated firms. For all the other groups, the change in cash is positive. The drop in assets in the last quarter of 2008 is striking. For the equally-weighted average, assets decrease by 5.44% in that quarter. We examine the decreases in assets for that quarter across firms and find that a major source of decreases in assets are write-downs of goodwill. In 2008, firms adopt FASB 157 which requires them to use an exit value for estimates of fair value. We would expect that such estimates would have fallen substantially in the last quarter of 2008 as the stock market fell dramatically. In an examination of goodwill impairments for the

last quarter of 2008, not only is the average impairment large (10.07% of assets for the firms that report such impairments) but the number of firms that report impairments is unusually large (from the first quarter of 2005 to the second quarter of 2007, the highest number of firms reporting impairments in a quarter is 165, but that number is 666 in the fourth quarter of 2008).

Section 4. Predicted versus unpredicted changes in financial policies

So far, we have shown that the first year of the financial crisis is not associated with lower net debt issuance by firms, but is associated with lower net new equity issuance by smaller and unrated firms. Cash holdings fall for small firms and firms with a non-investment grade rating or no rating. After September 2008, however, firms hoard cash, but much more so for larger firms and investment grade firms, and net debt issuance becomes exceptionally low at the peak of the crisis for all but large and investment grade firms. In this section, we investigate whether these changes can be explained by the evolution of firm characteristics, using empirical models from the recent literature. Our approach is to use these models to predict financial policies and to evaluate whether departures from these predicted values during the crisis, i.e. the abnormal values for these financial policies, are significant. None of these models were developed using quarterly data because quarterly data typically is not used in corporate finance research. Consequently, when we find that changes in a financial policy cannot be explained by fundamentals, it could be because the models we use are poorly specified when using quarterly data. However, we do find that our estimates of these models are consistent with estimates using yearly data. We also estimate the models using lagged values for firm characteristics, and the results we find are supportive of the results we report.

Section 4.1. Predicted and unpredicted cash holdings.

We first investigate abnormal cash. Our model for expected cash is the model used in Bates, Kahle, and Stulz (2009), but we estimate this model using quarterly data. This model allows for a transaction demand for cash as well as a precautionary demand for cash. The dependent variable is the cash ratio, and

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the following explanatory variables are used: the standard deviation of cash flows at the industry level (using two-digit SIC codes), the market-to-book ratio, the log of firm size, the ratio of cash flow to assets, the ratio of net working capital to assets, capital expenditures to assets, leverage, R&D to assets, a dummy variable for missing data on R&D, dividends to assets, acquisitions to assets, net equity issuance to assets, and net debt issuance to assets.[10] Because we use quarterly data, we add to the model indicator variables for the second, third, and fourth quarters to accommodate seasonal effects.

We estimate the model from the first quarter of 1995 through the first quarter of 2009. We also estimate the model over our whole sample period and our inferences are similar. Given that the cash ratio increases over time, we prefer to use a shorter sample period that better reflects cash holding patterns over the credit boom and the financial crisis. However, it turns out that whether we start the sample in 1983 or in 1995 makes no substantive difference for our conclusions. We estimate the model for all firms and then separately for the five size quintiles and for the three ratings groups. We use indicator variables for each quarter starting in the first quarter of 2005 to capture average abnormal cash (i.e., the cash ratio minus the predicted cash ratio). Since we know that cash holdings increase dramatically over time and that only part of the increase is explained by the firm characteristics typically used in models explaining cash holdings (see Bates, Kahle, and Stulz (2009)), we expect average abnormal cash to be positive, at least early in the credit boom period. Our interest is in how abnormal cash changes rather than in the level of these abnormal cash holdings.

Table 5, Panel A, reports the estimated regressions. Regression (1) shows estimates of the model for the whole sample of industrial firms. The independent variables take values that are consistent with estimates for the aggregate sample in Bates, Kahle, and Stulz (2009). The seasonal indicator variables are significant for the fourth quarter for the investment grade and unrated firms. We see that the abnormal cash ratio is roughly constant and significantly positive during the credit boom period. It falls in half in the first three quarters of 2008 and then increases sharply from 1.54% to 4.60% over the last two quarters

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[10] Not all firms report R&D on a quarterly basis. When a firm does not report R&D quarterly, we use the annual R&D, divided by four, as an estimate of R&D in each quarter of that year. Results are similar if we set R&D as missing for these firms.

of the sample. Consequently, the increase in the cash ratio after September 2008 is even larger after accounting for changes in fundamentals. Abnormal cash is significantly higher at the peak of the financial crisis than at the top of the credit boom.

The next two regressions in Panel A of Table 5 report results for the smallest and largest size quintiles. We also examine but do not report estimates for the other size quintiles. Almost all coefficients on the independent variables are significant and consistent in sign across size quintiles except for the coefficients on operating cash flow to assets and size. The indicator variable for the fourth quarter is positive and significant, except for the middle and largest quintiles. There are sharp differences in the evolution of abnormal cash across firm sizes. Abnormal cash at the top of the credit boom is not significantly different from abnormal cash at the peak of the financial crisis for the two smallest size quintiles, but this result is due to the increase in the cash ratio after September 2008. More specifically, abnormal cash drops in the first year of the crisis for the two quintiles of smallest firms. For the top three size quintiles, abnormal cash increases significantly over the crisis. More specifically, abnormal cash increases by 2.83 percentage points during the crisis for the largest firms. After September 2008, abnormal cash increases significantly for all but the two smallest size quintiles, but the increase in abnormal cash takes place almost exclusively in the first quarter of 2009. At the end of that quarter, firms in the three top quintiles of firm size have extremely large abnormal cash.

Regressions (4) to (6) show the results for the three ratings groups. For investment grade firms, abnormal cash falls during the credit boom and keeps falling until the end of 2007. After that, abnormal cash increases. Not surprisingly, abnormal cash for investment grade firms is significantly higher at the peak of the crisis compared to the top of the boom and compared to the third quarter of 2008. Abnormal cash increases by 6.56 percentage points over the crisis, but most of this increase occurs in the last quarter of the sample period. The increase in abnormal cash is much smaller for firms with a speculative rating. For these firms, abnormal cash becomes significantly negative during the crisis and is positive at the peak of the crisis, so that it increases by 2.27 percentage points after September 2008, but the latter increase is not statistically significant (p-value = 0.11). Finally, firms without a rating have positive abnormal cash

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throughout the credit boom and the financial crisis, but their abnormal cash has a u-shape during the crisis. The abnormal cash of these firms is similar at the end of the credit boom and at the peak of the financial crisis. However, their abnormal cash more than doubles after September 2008.

It follows from Panel A of Table 5 that abnormal cash for large and investment grade firms increases even more following the events of September 2008 than the cash ratio itself. Such a result implies that fundamentals typically used in cash holding regressions cannot explain the change in cash holdings in these firms after September 2008. However, changes in fundamentals seem to explain changes in cash holdings for the smaller firms. In the literature, small firms and firms without ratings are often viewed as firms that are financially constrained. These firms do not experience an increase in abnormal cash over the crisis, but they do not experience a significant decline either. The reason that constrained firms do not experience a decline in abnormal cash is due to the increase in the cash ratio after September 2008. Though we do not report the results in the table, we also estimate a regression that allows abnormal cash to evolve differently for constrained and unconstrained firms, where constrained firms are defined using the modified Levi-Korajczyk (2003) definition discussed earlier. For unconstrained firms, abnormal cash increases from 1.71% at the top of the credit boom to 4.00% at the peak of the crisis; before increasing after September 2008, however, abnormal cash falls to 0.59% in the second quarter of 2008. The abnormal cash of constrained firms exceeds the abnormal cash of unconstrained firms by 5.46% at the top of the credit boom and this excess falls to 4.02% at the peak of the crisis. This result is consistent with the evidence in Duchin, Ozbas, and Sensoy (2010) that constrained firms used their abnormal cash holdings early in the crisis. However, the abnormal cash of constrained firms increases by 3.07 percentage points after September 2008, showing that consumption of abnormal cash stops in September 2008.

Though our estimated cash model makes the cash ratio of a firm depend on the uncertainty of its environment, the uncertainty measure we use may not be sufficiently forward looking, and the absence of a forward-looking measure of uncertainty may explain why fundamentals do not seem to capture the increase in the cash ratio after September 2008. To explore this possibility, we estimate cash regressions (but do not reproduce them in a table) where we add the VIX at the beginning of the quarter and the

change in the VIX during the quarter as forward-looking measures of economic uncertainty. The VIX is often used as a measure of risk-aversion and is sometimes viewed as an investor fear gauge (see Durand, Lim, and Zumwalt (2007)). The addition of the VIX variables does not change our conclusions. Surprisingly, the VIX variables are not even significant when added to a regression for the whole sample. Since the VIX reached such high values in the fourth quarter of 2008, it may well be that more involved specifications using the VIX would be more successful, but with such specifications, the VIX would essentially become an indicator variable for the last quarter of 2008.

Though we do not report the results in a table, we also estimate the model of Almeida, Campello, and Weisbach (2003) using quarterly data. Using this model on a quarterly basis does not appear to work as well as using the cash holdings models on a quarterly basis. Nevertheless, we find that firms invested abnormally in cash out of cash flow in the last quarter of 2008, a result that is consistent with our other evidence.

Section 4.2. Predicted and unpredicted debt and equity issuance.

To estimate abnormal debt and equity issuance, we follow Fama and French (2008). We estimate their models from 1995 to 2009. However, they estimate their models using annual data, and some of the variables they use are not available quarterly in Compustat. Consequently, we modify some variable definitions to account for the quarterly data limitations and add other variables. Our corresponding independent variables include the percentage change in assets from the previous quarter, operating cash flow to assets, dividends to assets, a dummy variable equal to one if the firms pays dividends, lagged leverage, an indicator variable equal to one if book equity is negative, the lagged market capitalization, the market-to-book ratio (computed as book assets minus book equity plus market equity divided by assets), lagged cash over assets, lagged debt in current liabilities over assets, R&D over assets, and capital expenditures over assets. However, we lag the independent variables by one additional quarter to avoid having a mechanical relation between our independent variables and net issuance. As with the cash regressions, we allow for seasonality. To assess the role of the increase in credit spreads on debt and

equity issuance, we also estimate our regressions with the intermediate term treasury rate and the credit

spread of high yield debt over the intermediate term treasury rate. The high yield credit spread is 2.65% at

the peak of the credit boom and 10.63% at the end of the first quarter of 2009. At the end of 2008, the

high yield credit spread is at 13.04%. We would expect that such a dramatic increase in credit spreads

would have an adverse impact on the demand for debt. We only report the results without the credit

spreads in the table, but also discuss untabulated results that include the credit spreads.

As with cash holdings, we start by examining regressions for the whole sample. We first estimate the

models from 1995 to 2005 and then use these models to forecast net debt issuance through the end of the

sample. This exercises highlights the importance of the changes in credit spreads. The forecasted net debt

issuance for the broadest definition of net debt is shown on Figure 5a. There is no evidence that

fundamentals lead to a decrease in net debt issuance after September 2008 when we estimate models

without the interest rate and credit spread variables. However, the impact of these variables is dramatic.

Predicted net debt issuance when net debt issuance is made to depend on interest rates and credit spreads

becomes negative after September 2008. The increase in credit spreads does not by itself provide

evidence of a credit supply shock since credit spreads can increase because of increases in risk aversion or

because of poorer prospects of firms. In particular, the mean KMV EDF for the North American CDX

index (125 investment grade names) increased from 0.69% on September 15, 2008 (the day of the

Lehman bankruptcy) to 2.99% at the end of March 2009.

We next estimate net debt issuance models equivalent to the models in Panel A of Table 5 for cash

holdings. Though we estimate the regressions for both definitions of debt issuance, we focus on the

broadest definition and do not report in Panel B of Table 5 the estimates for the narrower definition.

Regression (1) is estimated using all industrial firms. The estimates of the coefficients on firm

characteristics are generally unsurprising. The quarterly indicator variables are mostly insignificant. The

unpredicted part of net debt issuance is negative and significant in the two quarters after September 2008,

but at no other time during the financial crisis. The results are similar for the narrower definition of net

long-term issuance debt. When we turn to size and investment rating groups, we find that in the last

quarter of 2008, investment grade firms and large firms do not have abnormal net debt issuance. However, in the first quarter of 2009, all subsamples have significant negative abnormal net debt issuance. When we take into account credit spreads, firms have positive abnormal net debt issuance in the last quarter of 2008 (not reported), showing again the importance of the changes in credit spreads.

Finally, as with net debt issuance, we estimate net equity issuance models from 1995-2004 and forecast net equity issuance going forward to the end of the sample period. The independent variables are the same as the ones used in the net debt issuance model. The results are also reproduced in Figure 5b. Whether we account for the credit spreads in the regression or not, the models predict low net equity issuance in 2008. We then turn to models where we estimate abnormal net equity issuance. Panel C of Table 5 shows regressions estimating net equity issuance. The first regression provides estimates for the whole sample. Estimates of abnormal net equity issuance are significantly negative early in 2008, but not after September 2008. Remember, however, that the model predicts negative net equity issuance in the last two quarters of the sample period. When we turn to subsamples, we find that the negative abnormal equity issuance is concentrated among small firms and unrated firms. These firms have significantly negative abnormal equity issuance throughout 2008. There is no evidence, therefore, that these firms somehow use equity to make up for abnormal net debt issuance brought about by a curtailment in the supply of debt – these firms issue abnormally low amounts of equity before they issue abnormally low amounts of debt, and when they issue abnormally low amounts of debt they do not issue more equity.

Section 5. Conclusion.

We examine financial policies of firms throughout the credit boom and from the start of the financial crisis to its peak to understand what these policies tell us about the financial crisis. The conventional view of the crisis focuses on the impact on industrial firms of an exogenous credit supply shock resulting from bank losses in so-called toxic assets. However, the crisis also reduced investment opportunities for firms and increased risk. We explore the impact on financial policies of these three shocks. If the credit supply shock is the dominant shock, we expect cash holdings to fall and net equity issuance to increase. We find

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that net equity issuance decreases during the crisis and that this decrease occurs before the decrease in net debt issuance. Further, while the ratio of cash to assets decreases for small firms and non-investment grade firms before September 2008, it increases afterwards for all firm types. The dramatic decrease in net equity issuance we document as well as the increase in cash holdings after September 2008 are difficult to reconcile with narratives of the crisis that put the exogenous reduction in credit as the central propagation mechanism. We find that the cumulative loss of financing cash flows from the decrease in net equity issuance is more important than the cumulative loss of financing cash flows from the decrease in net debt issuance for small and unrated firms. For large and investment grade firms, net debt issuance after September 2008 is not exceptionally low and its reduction is more than made up by the decrease in stock repurchases. The evidence is consistent with the decrease in investment opportunities and the increase in risk having a stronger effect on financial policies than the exogenous supply shock to credit.

References

Almeida, Heitor, Murillo Campello, and Michael S. Weisbach, 2004, The cash flow sensitivity of cash, Journal of Finance 59, 1777-1804.

Almeida, Heitor, Murillo Campello, Bruno Laranjeira and Scott Weisbenner, 2009, Corporate debt maturity and the real effects of the 2007 financial crisis, working paper, University of Illinois, Ill.

Baker, Malcolm, 2009, Capital market-driven corporate finance, Annual Review of Financial Economics 1, 181-205.

Bates, Thomas, Kathleen Kahle, and René Stulz, 2009, Why do U.S. firms hold so much more cash than they used to? Journal of Finance 64, 1985-2022.

Becker, Bo, and Victoria Ivashina, 2010, Cyclicality of credit supply: Firm level evidence, unpublished paper, Harvard Business School, MA.

Bernanke, Ben S., 1983, Nonmonetary effects of the financial crisis in the propagation of the Great Depression, The American Economic Review 73, 257-276.

Bernanke, Ben S., 2007, The financial accelerator and the credit channel, Federal Reserve Board, Washington, D.C.

Boyson, N., Jean Helwege, and Jan Jindra, 2010, Crises, Liquidity Shocks, and Fire Sales at Financial Institutions, working paper, University of South Carolina.

Brunnermeier, Markus K., 2009, Deciphering the liquidity and credit crunch 2007-2008, Journal of Economic Perspectives 23, 77-100.

Campbell, John Y., Stefano Giglio, and Christopher Polk, 2010, Hard times, working paper, National Bureau of Economic Research, Cambridge, MA.

Campello, Murillo, Erasmo Giambona, John R. Graham, and Campbell R. Harvey, 2009, Liquidity management and corporate investment during a financial crisis, working paper, University of Illinois, Ill.

Campello, Murillo, John R. Graham, and Campbell R. Harvey, 2010, The real effects of financial constraints: Evidence from a financial crisis, Journal of Financial Economics, forthcoming.

Chari, V.V., Lawrence J. Christiano, and Patrick J. Kehoe, 2008, Facts and Myths about the Financial Crisis of 2008, working paper, Federal Reserve Bank of Minnesota.

DeAngelo, Harry, Linda DeAngelo, and René M. Stulz, 2010, Seasoned equity offerings, market timing, and the corporate lifecycle," Journal of Financial Economics 95, 275-295.

Duchin, Ran, Oguzhan Ozbas, and Berk A. Sensoy, 2010, Costly external finance, corporate investment, and the subprime mortgage financial crisis, Journal of Financial Economics, forthcoming.

Durand, Robert B., Dominic Lim, and J. Kenton Zumwalt, 2007, Fear and the Fama-French factors, working paper, Colorado State University.

Erel, Isil, Brandon Julio, Woojin Kim, and Michael S. Weisbach, 2010, Macroeconomic conditions and the structure of securities, working paper, The Ohio State University, OH.

Fama, Eugene F. and Kenneth R. French, 2005, Financing decisions: Who issues stock?, Journal of Financial Economics 76, 549-582.

Fama, Eugene F. and Kenneth R. French, 2008, Opportunistic financing, working paper, University of Chicago.

Faulkender, Michael and Mitchell A. Petersen, 2006, Does the source of capital affect capital structure?, Review of Financial Studies 19, 45-79.

Gao, Pengjie, and Hayong Yun, 2009, Commercial paper, lines of credit, and the real effects of the financial crisis of 2008: Firm-level evidence from the manufacturing industry, working paper, University of Notre Dame, Notre Dame, IN.

Gertler, Mark and Simon Gilchrist, 1994, Monetary policy, business cycles, and the behavior of small manufacturing firms, The Quarterly Journal of Economics 109(2), 309-40.

Gorton, Gary, 2010, Slapped by the invisible hand: The panic of 2007, Oxford University Press, Oxford.

Hamilton, James D., 2009, Causes and Consequences of the oil shock of 2007-08, Brookings Papers on Economic Activity, 215-259.

Ivashina, Victoria, and David Scharfstein, 2010a, Bank lending during the financial crisis of 2008, Journal of Financial Economics 97, 319-338.

Ivashina, Victoria, and David Scharfstein, 2010b, Liquidity management in the financial crisis, working paper, Harvard Business School.

Iyer, Rajkamal, Samuel Lopes, José-Luis Peydró, and Antoinette Schoar, 2010, Interbank liquidity crunch and the firm credit crunch: Evidence from the 2007-2009 crisis, unpublished, MIT, Cambridge, MA.

Kashyap, Anil K., Owen A. Lamont and Jeremy C. Stein, 1994, Credit conditions and the cyclical behavior of Inventories, The Quarterly Journal of Economics 109(3), 565-92.

Kashyap, Anil K., Jeremy C. Stein and David W. Wilcox, 1993, Monetary policy and credit conditions: Evidence from the composition of external finance, American Economic Review 83(1), 78-98.

Korajczyk, Robert A. and A. Levi, 2003, Capital structure choice: macroeconomic conditions and financial constraints, Journal of Financial Economics 68(1), 75-109.

Kuppuswamy, Venkat, and Belen Villalonga, 2010, Does diversification create value in the presence of external financial constraints? Evidence from the 2008-2009 financial crisis, Harvard Business School working paper,.

Leamer, Edward E., 2007, Housing is the business cycle, NBER working paper, NBER, Cambridge, MA.

Leary, Mark T., 2009, Bank loan supply, lender choice, and corporate capital structure, Journal of Finance 64(3), 1143-1185.

Leary, Mark T., and Michael R. Roberts, 2005, Do firms rebalance their capital structure?, Journal of Finance 60, 2575-2619.

Lemmon, Michael and Michael R. Roberts, 2010, The response of corporate financing and investment to changes in the supply of credit, Journal of Financial and Quantitative Analysis 43, 555-587.

Miller, Merton H., 1963, The corporate income tax and corporate financial policies, Cowles Foundation Paper 210b.

Minton, Bernadette A., and Catherine Schrand, 1999, The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing, Journal of Financial Economics 54, 423-460.

Opler, Tim, Lee Pinkowitz, René M. Stulz, and Rohan Williamson, 1999, The determinants and implications of corporate cash holdings, Journal of Financial Economics 52, 3-46.

Pastor, Lubos, and Pietro Veronesi, 2010, Uncertainty about Government policy and stock prices, working paper, University of Chicago.

Paulson, Henry M., 2010, On the brink: Inside the race to stop the collapse of the global financial system, Business Plus, New York, NY.

Sufi, Amir, 2009, Bank lines of credit in corporate finance: An empirical analysis, Review of Financial Studies 22, 1057-1088.

Table 1: Summary of Empirical Predictions for Financial Policies

This table summarizes the direction of the expected empirical relations for the variables of interest under each of our three hypotheses.

	Credit Supply Shock Hypotheses	**Risk Shock Hypothesis**	**Loss of Investment opportunities Hypothesis**
Debt issuance	Lower	Lower	Lower
Equity issuance	Higher	Lower	Lower
Share repurchases	Lower	Lower	Higher
Cash holdings	Lower	Higher	Lower
Credit lines	Draw down	Draw down	Leave unchanged

Table 2: Financial Policies Statistics During the Credit Boom and the Financial Crisis

Panel A: Financial Policies Using Asset-weighted Averages

This table examines the time series of firm financial policy variables, on an asset-weighted basis, from the first quarter of 2005 to the first quarter of 2009. We begin with quarterly data collected from the CRSP/Compustat Merged (CCM) Fundamentals Quarterly database for 1980-2009. We delete observations with negative total assets (ATQ), negative sales (SALEQ), negative cash and marketable securities (CHQ), cash and marketable securities greater than total assets, and firms not incorporated in the U.S. We also eliminate all financial firms, which we define as firms with SIC codes between 6000 and 6999 and utilities, which we define as firms with SIC codes between 4900 and 4949. Other variable definitions are provided in the Appendix. To examine the significance of the time series changes we use two approaches. In the seasonality-adjusted p-values, we compare the change of interest to changes over identical quarterly calendar periods to account for seasonality. In Newey-West p-values, we use all two-quarter changes but relies on Newey-West t-statistics to account for overlap.

Quarter	N	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
2005Q1	3444	0.1042	0.0011	0.0013	-0.0039	0.0106	0.0225
2005Q2	3413	0.1019	-0.0015	0.0002	-0.0056	0.0126	0.0377
2005Q3	3381	0.1018	0.0026	0.0036	-0.0057	0.0129	0.0316
2005Q4	3317	0.1053	0.0043	0.0061	-0.0072	0.0146	0.0682
2006Q1	3347	0.0971	0.0073	0.0090	-0.0062	0.0128	0.0345
2006Q2	3325	0.0963	0.0047	0.0079	-0.0102	0.0141	0.0415
2006Q3	3318	0.0955	0.0058	0.0067	-0.0095	0.0141	0.0503
2006Q4	3225	0.0964	0.0015	0.0067	-0.0058	0.0159	0.0499
2007Q1	3240	0.0956	0.0068	0.0071	-0.0074	0.0133	0.0356
2007Q2	3198	0.0949	0.0077	0.0087	-0.0110	0.0143	0.0458
2007Q3	3179	0.0962	0.0064	0.0097	-0.0117	0.0142	0.0447
2007Q4	3122	0.0955	0.0080	0.0098	-0.0091	0.0158	0.0469
2008Q1	3167	0.0890	0.0061	0.0097	-0.0088	0.0136	0.0362
2008Q2	3101	0.0890	0.0071	0.0067	-0.0059	0.0146	0.0442
2008Q3	3078	0.0889	0.0061	0.0043	-0.0065	0.0155	0.0442
2008Q4	3000	0.0981	0.0035	0.0009	-0.0028	0.0156	0.0484
2009Q1	2971	0.1018	0.0077	-0.0019	-0.0019	0.0111	0.0236
Avg 1983-2004		0.0675	0.0036	0.0065	-0.0009	0.0183	0.0451
Avg 1990-2004		0.0666	0.0036	0.0056	-0.0008	0.0171	0.0454
Min		0.0486	-0.0057	-0.0164	-0.0076	0.0097	0.0204
Max		0.1077	0.0144	0.0460	0.0061	0.0295	0.0608
Std. Dev.		0.0149	0.0034	0.0077	0.0021	0.0040	0.0076
Post crisis vs pre crisis							
Avg (2007Q3-2008Q2)		0.0924	0.0069	0.0090	-0.0089	0.0146	0.0430
Avg (2006Q3-2007Q2)		0.0956	0.0055	0.0073	-0.0084	0.0144	0.0454
Difference		-0.0032	0.0014	0.0017	-0.0005	0.0002	-0.0024
seasonality adjusted p-values		0.6484	0.5044	0.7192	0.8116	0.9365	0.6943
Post vs pre 9/2008							
2009Q1		0.1018	0.0077	-0.0019	-0.0019	0.0111	0.0236
2008Q3		0.0889	0.0061	0.0043	-0.0065	0.0155	0.0442
2007Q2		0.0949	0.0077	0.0087	-0.0110	0.0143	0.0458
Difference (2009Q1 - 2008Q3)		0.0130	0.0016	-0.0062	0.0046	-0.0044	-0.0206
Newey West test p-values		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Seasonality adjusted p-values		0.0433	0.7082	0.2423	0.0758	0.0842	0.0274
Difference (2009Q1 - 2007Q2)		0.0070	0.0000	-0.0106	0.0091	-0.0032	-0.0222
Newey West test p-values		0.0000	0.6400	0.0000	0.0000	0.0000	0.0000
Seasonality adjusted p-values		0.4982	0.9995	0.1844	0.0009	0.3788	0.0234

Table 2, Panel B: Financial Policies Using Equally-Weighted Averages

This table examines the means of the time series of firm financial policy variables, on an equal-weighted basis, from the first quarter of 2005 to the first quarter of 2009.   We begin with quarterly data collected from the CRSP/Compustat Merged (CCM) Fundamentals Quarterly database for 1980-2009. We delete observations with negative total assets (ATQ), negative sales (SALEQ), negative cash and marketable securities (CHQ), cash and marketable securities greater than total assets, and firms not incorporated in the U.S. We also eliminate all financial firms, which we define as firms with SIC codes between 6000 and 6999 and utilities, which we define as firms with SIC codes between 4900 and 4949. Other variable definitions are provided in the Appendix. We report p-values for paired t-tests using the firms that exist in both quarters when examining the significance of the difference between the quarters of interest.

Quarter	N	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
2005Q1	3597	0.2302	0.0046	0.0053	0.0118	0.0123	0.0255
2005Q2	3578	0.2242	0.0019	0.0035	0.0078	0.0137	0.0331
2005Q3	3539	0.2237	0.0042	0.0065	0.0120	0.0138	0.0333
2005Q4	3501	0.2303	0.0034	0.0041	0.0141	0.0148	0.0453
2006Q1	3495	0.2253	0.0051	0.0064	0.0152	0.0138	0.0244
2006Q2	3478	0.2229	0.0060	0.0070	0.0104	0.0150	0.0300
2006Q3	3475	0.2182	0.0052	0.0083	0.0048	0.0146	0.0313
2006Q4	3413	0.2222	0.0056	0.0061	0.0143	0.0153	0.0409
2007Q1	3389	0.2194	0.0075	0.0081	0.0087	0.0140	0.0245
2007Q2	3357	0.2193	0.0079	0.0105	0.0142	0.0150	0.0301
2007Q3	3323	0.2179	0.0065	0.0092	0.0079	0.0150	0.0313
2007Q4	3293	0.2208	0.0063	0.0086	0.0083	0.0156	0.0407
2008Q1	3312	0.2043	0.0084	0.0104	0.0005	0.0137	0.0226
2008Q2	3250	0.1992	0.0054	0.0062	0.0033	0.0149	0.0326
2008Q3	3220	0.1957	0.0045	0.0081	0.0021	0.0144	0.0320
2008Q4	3160	0.2008	-0.0002	-0.0004	(0.0000)	0.0131	0.0305
2009Q1	3126	0.2015	-0.0015	-0.0045	0.0030	0.0097	0.0131
Avg 1983-2004		0.1605	0.0049	0.0086	0.0125	0.0184	0.0272
Avg 1990-2004		0.1721	0.0044	0.0074	0.0138	0.0172	0.0288
Min		0.1215	-0.0020	-0.0013	0.0027	0.0105	0.0120
Max		0.2316	0.0144	0.0197	0.0354	0.0275	0.0426
Std. Dev.		0.0319	0.0034	0.0050	0.0055	0.0035	0.0070
Post crisis vs pre crisis							
Avg (2007Q3-2008Q2)		0.2105	0.0066	0.0086	0.0050	0.0148	0.0318
Avg (2006Q3-2007Q2)		0.2198	0.0065	0.0082	0.0105	0.0147	0.0317
Difference		-0.0092	0.0001	0.0004	-0.0055	0.0001	0.0001
Ttest pre vs post crisis		0.0034	0.8549	0.6294	0.0001	0.7855	0.9726
Post vs pre 9/2008							
2009Q1		0.2015	-0.0015	-0.0045	0.0030	0.0097	0.0131
2008Q3		0.1957	0.0045	0.0081	0.0021	0.0144	0.0320
2007Q2		0.2193	0.0079	0.0105	0.0142	0.0150	0.0301
Diff. (2009Q1 - 2008Q3)		0.0058	-0.0060	-0.0126	0.0010	-0.0046	-0.0189
Paired Diff.		0.0070	-0.0057	-0.0124	0.0013	-0.0049	-0.0203
Ttest 2008Q3=2009Q1		0.0001	0.0001	0.0001	0.1426	0.0001	0.0001
Diff. (2009Q1 - 2007Q2)		-0.0178	-0.0094	-0.0150	-0.0112	-0.0053	-0.0171
Paired Diff.		-0.0196	-0.0096	-0.0163	-0.0109	-0.0061	-0.0202
Ttest 2007Q2=2009Q1		0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Table 3: Summary Statistics on Lines of Credit

This table examines data on lines of credit for a random sample of 300 firms chosen as of the second quarter of 2007. We follow the approach in Sufi (2009) in sampling the firms. % new drawdown is the percentage of firms in that quarter that draw down a line of credit. Drawdown to loc is the ratio of the amount drawn down to the firm's total line of credit. Loc/assets is the ratio of lines of credit to total assets. Drawdown/assets is the ratio of new draw-downs in that quarter to total assets.

Quarter	Nobs.	% Nobs with loc	For obs. with loc > 0:			Aggregate sample		Equal-weighted sample	
			% new drawdown	new drawdown to loc	total drawdown to loc	loc/ assets	new drawdown/ assets	loc/ assets	new drawdown/ assets
2007Q1	283	0.806	0.2719	0.0387	0.2533	0.0916	0.0037	0.1456	0.0066
2007Q2	300	0.810	0.3210	0.0428	0.2537	0.0953	0.0031	0.1502	0.0093
2007Q3	293	0.823	0.2780	0.0409	0.2533	0.0945	0.0032	0.1463	0.0079
2007Q4	279	0.817	0.3728	0.0784	0.2842	0.0973	0.0128	0.1583	0.0172
2008Q1	277	0.830	0.3478	0.0660	0.3078	0.0951	0.0050	0.1556	0.0109
2008Q2	265	0.834	0.2760	0.0311	0.2943	0.0883	0.0019	0.1573	0.0056
2008Q3	262	0.828	0.3134	0.0491	0.3015	0.0913	0.0057	0.1601	0.0086
2008Q4	252	0.833	0.3238	0.0527	0.3117	0.0997	0.0048	0.1754	0.0103
2009Q1	246	0.829	0.2892	0.0285	0.3273	0.1003	0.0016	0.1651	0.0066

Table 4: Financial Policies by Size, Debt Rating, and Financial Constraint Groupings

This table examines the means of the time series of firm financial policy variables, on an equal-weighted basis, from the first quarter of 2005 to the first quarter of 2009 for firms categorized according to size, debt, rating, and financial constraint.   Panel A examines size quintiles, which are formed quarterly by dividing all NYSE firms into five quintiles based on assets; we then assign the non-NYSE firms to these quintiles. Panel B examines firms by debt rating. We divide firms quarterly into firms with an investment grade rating, a speculative rating, and no rating using the S&P long-term rating (*splticrm*) available on Compustat. Panel C examines financially constrained vs. unconstrained firms. We examine whether a firm is financially constrained as of the second quarter of 2007, and define a firm to be constrained if it (1) does not pay dividends, (2) does not have net equity repurchases, (3) does not have a credit rating, and (4) has a Tobin's q greater than one (defined as the market value of the assets divided by the book value, where market value of assets is book value minus book equity plus market value of equity). Variable definitions are provided in the Appendix.

Panel A: Smallest vs Largest Firms

Sizerank = 0 (smallest)	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
Avg 1983-2004	0.1946	0.0047	0.0092	0.0180	0.0181	0.0200
Avg 1990-2004	0.2107	0.0040	0.0076	0.0199	0.0168	0.0222
Min	0.1430	-0.0012	-0.0011	0.0055	0.0049	0.0049
Max	0.2857	0.0120	0.0194	0.0487	0.0394	0.0394
Std. Dev.	0.0412	0.0034	0.0052	0.0075	0.0076	0.0076
Post crisis vs pre crisis						
Avg (2007Q3-2008Q2)	0.2697	0.0065	0.0083	0.0112	0.0141	0.0241
Avg (2006Q3-2007Q2)	0.2785	0.0064	0.0083	0.0190	0.0140	0.0247
Difference	-0.0087	0.0001	0.0000	-0.0079	0.0002	-0.0006
Ttest	0.0833	0.8794	0.9997	0.0001	0.7639	0.5152
Post vs pre 9/2008						
2009Q1	0.2572	-0.0020	-0.0025	0.0052	0.0085	0.0046
2008Q3	0.2514	0.0040	0.0086	0.0054	0.0132	0.0248
2007Q2	0.2785	0.0072	0.0104	0.0254	0.0141	0.0212
Diff. (2009Q1-2008Q3)	0.0058	-0.0060	-0.0111	-0.0002	-0.0047	-0.0202
Paired Diff.	0.0050	-0.0055	-0.0108	0.0000	-0.0049	-0.0217
Ttest 2008Q3=2009Q1*	0.0139	0.0001	0.0001	0.9880	0.0001	0.0001
Diff. (2009Q1-2007Q2)	-0.0213	-0.0092	-0.0129	-0.0202	-0.0056	-0.0166
Paired Diff.	-0.0316	-0.0094	-0.0143	-0.0214	-0.0063	-0.0196
Ttest 2007Q2=2009Q1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Sizerank = 4 (largest)	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
Avg 1983-2004	0.0631	0.0031	0.0052	-0.0014	0.0189	0.0463
Avg 1990-2004	0.0622	0.0029	0.0044	-0.0016	0.0178	0.0461
Min	0.0476	-0.0054	-0.0114	-0.0100	0.0096	0.0259
Max	0.1069	0.0120	0.0167	0.0023	0.0270	0.0656
Std. Dev.	0.0127	0.0039	0.0061	0.0021	0.0039	0.0074
Post crisis vs pre crisis						
Avg (2007Q3-2008Q2)	0.0871	0.0043	0.0066	-0.0079	0.0149	0.0451
Avg (2006Q3-2007Q2)	0.0922	0.0030	0.0042	-0.0081	0.0148	0.0461
Difference	-0.0051	0.0013	0.0024	0.0002	0.0000	-0.0009
Ttest	0.3281	0.4040	0.2781	0.7786	0.9834	0.7703
Post vs pre 9/2008						
2009Q1	0.0980	0.0083	-0.0001	-0.0014	0.0105	0.0267
2008Q3	0.0856	0.0041	0.0021	-0.0058	0.0152	0.0466
2007Q2	0.0897	0.0070	0.0072	-0.0095	0.0151	0.0486
Diff. (2009Q1-2008Q3)	0.0123	0.0041	-0.0022	0.0044	-0.0047	-0.0199
Paired Diff.	0.0118	0.0023	-0.0035	0.0051	-0.0046	-0.0203
Ttest 2008Q3=2009Q1*	0.0001	0.4534	0.3620	0.0001	0.0001	0.0001
Diff. (2009Q1-2007Q2)	0.0082	0.0012	-0.0073	0.0080	-0.0046	-0.0219
Paired Diff.	0.0109	0.0002	-0.0120	0.0085	-0.0050	-0.0230
Ttest 2007Q2=2009Q1	0.0632	0.9805	0.0085	0.0001	0.0001	0.0001

Panel B: Debt Rating

Investment Grade

	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
Avg 1983-2004	0.0603	0.0051	0.0073	-0.0019	0.0188	0.0468
Avg 1990-2004	0.0577	0.0049	0.0068	-0.0022	0.0180	0.0476
Min	0.0450	-0.0019	-0.0023	-0.0090	0.0105	0.0267
Max	0.0980	0.0155	0.0204	0.0042	0.0276	0.0611
Std. Dev.	0.0123	0.0034	0.0056	0.0023	0.0039	0.0072
Post crisis vs pre crisis						
Avg (2007Q3-2008Q2)	0.0810	0.0080	0.0109	-0.0106	0.0138	0.0505
Avg (2006Q3-2007Q2)	0.0821	0.0044	0.0060	-0.0097	0.0139	0.0500
Difference	-0.0011	0.0036	0.0049	-0.0009	-0.0001	0.0005
Ttest	0.7722	0.0248	0.0180	0.2234	0.8942	0.8773
Post vs pre 9/2008						
2009Q1	0.0947	0.0053	0.0001	-0.0014	0.0100	0.0334
2008Q3	0.0828	0.0051	0.0065	-0.0084	0.0134	0.0505
2007Q2	0.0804	0.0056	0.0069	-0.0106	0.0137	0.0522
Diff. (2009Q1-2008Q3)	0.0119	0.0002	-0.0064	0.0069	-0.0034	-0.0170
Paired Diff.	0.0105	0.0000	-0.0067	0.0072	-0.0036	-0.0168
Ttest 2008Q3=2009Q1*	0.0001	0.9913	0.0545	0.0001	0.0001	0.0001
Diff. (2009Q1-2007Q2)	0.0143	-0.0003	-0.0068	0.0092	-0.0037	-0.0187
Paired Diff.	0.0128	-0.0005	-0.0068	0.0093	-0.0042	-0.0197
Ttest 2007Q2=2009Q1	0.0021	0.8179	0.0079	0.0001	0.0001	0.0001

Speculative

	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
Avg 1983-2004	0.0942	0.0096	0.0125	0.0048	0.0184	0.0316
Avg 1990-2004	0.0905	0.0087	0.0119	0.0065	0.0186	0.0314
Min	0.0729	-0.0056	-0.0091	-0.0144	0.0100	0.0118
Max	0.1332	0.0337	0.0446	0.0168	0.0278	0.0602
Std. Dev.	0.0135	0.0087	0.0108	0.0055	0.0041	0.0090
Post crisis vs pre crisis						
Avg (2007Q3-2008Q2)	0.0809	0.0057	0.0089	0.0010	0.0189	0.0372
Avg (2006Q3-2007Q2)	0.0886	0.0134	0.0163	0.0022	0.0184	0.0368
Difference	-0.0077	-0.0077	-0.0073	-0.0012	0.0005	0.0004
Ttest	0.1047	0.0001	0.0031	0.3379	0.5985	0.8755
Post vs pre 9/2008						
2009Q1	0.0886	-0.0035	-0.0120	0.0007	0.0122	0.0185
2008Q3	0.0803	0.0048	0.0068	0.0000	0.0185	0.0397
2007Q2	0.0859	0.0168	0.0205	0.0018	0.0197	0.0410

	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
Speculative, cont'd						
Diff. (2009Q1-2008Q3)	0.0083	-0.0082	-0.0188	0.0006	-0.0063	-0.0212
Paired Diff.	0.0090	-0.0086	-0.0195	0.0006	-0.0064	-0.0249
Ttest 2008Q3=2009Q1*	0.0001	0.0025	0.0001	0.5091	0.0001	0.0001
Diff. (2009Q -2007Q2)	0.0027	-0.0203	-0.0325	-0.0011	-0.0075	-0.0225
Paired Diff.	-0.0004	-0.0214	-0.0360	-0.0022	-0.0083	-0.0249
Ttest 2007Q2=2009Q1	0.5070	0.0001	0.0001	0.1746	0.00017	0.0001

	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
Unrated						
Avg 1983-2004	0.1801	0.0044	0.0082	0.0148	0.0180	0.0249
Avg 1990-2004	0.1962	0.0038	0.0069	0.0166	0.0169	0.0264
Min	0.1215	-0.0013	-0.0015	0.0041	0.0104	0.0120
Max	0.2755	0.0120	0.0171	0.0429	0.0275	0.0416
Std. Dev.	0.0441	0.0032	0.0049	0.0067	0.0035	0.0073
Post crisis vs pre crisis						
Avg (2007Q3-2008Q2)	0.2562	0.0067	0.0083	0.0080	0.0141	0.0279
Avg (2006Q3-2007Q2)	0.2671	0.0054	0.0069	0.0152	0.0141	0.0279
Difference	-0.0109	0.0013	0.0014	-0.0071	0.0000	0.0000
Ttest	0.0147	0.0830	0.1540	0.0001	0.9289	0.9646
Post vs pre 9/2008						
2009Q1	0.2414	-0.0020	-0.0035	0.0042	0.0091	0.0088
2008Q3	0.2370	0.0044	0.0087	0.0040	0.0136	0.0274
2007Q2	0.2677	0.0063	0.0089	0.0204	0.0142	0.0244
Diff. (2009Q1-2008Q3)	0.0044	-0.0064	-0.0122	0.0002	-0.0045	-0.0186
Paired Diff.	0.0060	-0.0059	-0.0117	0.0006	-0.0048	-0.0204
Ttest 2008Q3=2009Q1*	0.0006	0.0001	0.0001	0.6170	0.0001	0.0001
Diff. (2009Q1-2007Q2)	-0.0263	-0.0083	-0.0124	-0.0162	-0.0051	-0.0156
Paired Diff.	-0.0292	-0.0085	-0.0134	-0.0162	-0.0059	-0.0192
Ttest 2007Q2=2009Q1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Panel C: Unconstrained vs Constrained

Unconstrained	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
Post crisis vs pre crisis						
Avg (2007Q3-2008Q2)	0.1607	0.0060	0.0082	0.0008	0.0145	0.0355
Avg (2006Q3-2007Q2)	0.1741	0.0055	0.0078	0.0058	0.0149	0.0309
Difference	-0.0134	0.0005	0.0004	-0.0050	-0.0004	-0.0004
Ttest	0.0001	0.4625	0.6731	0.0001	0.3448	0.7817
Post vs pre 9/2008						
2009Q1	0.1572	-0.0020	-0.0059	0.0009	0.0097	0.0205
2008Q3	0.1499	0.0043	0.0072	-0.0001	0.0138	0.0362
2007Q2	0.1741	0.0037	0.0071	0.0088	0.0149	0.0355
Diff. (2009Q1 - 2008Q3)	0.0074	-0.0062	-0.0131	0.0011	-0.0040	-0.0156
Paired Diff.	0.0093	-0.0064	-0.0133	0.0017	-0.0042	-0.0166
Ttest 2008Q3=2009Q1*	0.0001	0.0001	0.0001	0.0487	0.0001	0.0001
Diff. (2009Q1 - 2007Q2)	-0.0168	-0.0057	-0.0130	-0.0078	-0.0052	-0.0150
Paired Diff.	-0.0117	-0.0066	-0.0142	-0.0059	-0.0059	-0.0195
Ttest 2007Q2=2009Q1	0.0001	0.0001	0.0001	0.0002	0.0001	0.0001

Constrained	Cash to assets	Net long-term debt issuance	Net total debt issuance	Net equity issuance	Capex	Operating cash flow
Post crisis vs pre crisis						
Avg (2007Q3-2008Q2)	0.3370	0.0073	0.0082	0.0118	0.0147	0.0241
Avg (2006Q3-2007Q2)	0.3551	0.0099	0.0101	0.0245	0.0147	0.0220
Difference	-0.0181	-0.0026	-0.0018	-0.0127	-0.0001	0.0021
Ttest	0.0669	0.0194	0.2176	0.0001	0.9201	0.4239
Post vs pre 9/2008						
2009Q1	0.3109	0.0002	-0.0030	0.0076	0.0095	-0.0033
2008Q3	0.3073	0.0045	0.0088	0.0042	0.0144	0.0241
2007Q2	0.3577	0.0207	0.0210	0.0309	0.0154	0.0123
Diff. (2009Q1 - 2008Q3)	0.0037	-0.0043	-0.0118	0.0033	-0.0049	-0.0274
Paired Diff.	0.0060	-0.0032	-0.0102	0.0030	-0.0052	-0.0292
Ttest 2008Q3=2009Q1*	0.1116	0.1497	0.0013	0.2541	0.0001	0.0001
Diff. (2009Q1 - 2007Q2)	-0.0468	-0.0205	-0.0240	-0.0234	-0.0059	-0.0156
Paired Diff.	-0.0457	-0.0195	-0.0232	-0.0275	-0.0068	-0.0227
Ttest 2007Q2=2009Q1	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001

Table 5: Expected and unexpected cash holdings, net debt issuance and net equity issuance

Panel A examines the determinants of cash holdings. Panel B examines the determinants of debt issuance, where debt issuance is defined as the change in long-term and short-term debt. Panel C examines the determinants of equity issuance. Robust standard errors are reported in brackets. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level. Variable definitions are provided in the Appendix.

Panel A: Quarterly Cash/assets

	(1) 1995Q1-2009Q1	(2) Smallest firms	(3) Largest firms	(4) Investment	(5) Speculative	(6) Unrated
Sigma12	1.4888***	1.7493***	0.3179***	0.2746***	0.5106***	1.6722***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Market-to-book	0.0203***	0.0204***	0.0166***	0.0164***	0.0360***	0.0199***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.0046***	0.0106***	-0.0021**	-0.0027***	-0.0059***	0.0008**
	(0.000)	(0.000)	(0.041)	(0.000)	(0.000)	(0.012)
Operating cash flow	0.0415***	0.0091	0.1123***	0.1232***	-0.0123	0.0205***
	(0.000)	(0.136)	(0.000)	(0.000)	(0.386)	(0.000)
NWC	-0.2643***	-0.2869***	-0.1722***	-0.0854***	-0.1771***	-0.2852***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Capex	-1.0653***	-1.1622***	-0.5009***	-0.7476***	-0.3640***	-1.1952***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.3538***	-0.4339***	-0.1449***	-0.1687***	-0.1150***	-0.4264***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
R&D	0.3889***	0.3329***	0.6829***	0.6665***	1.1383***	0.3485***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Rdmiss	-0.0132***	-0.0236***	0.0049***	0.0153***	0.0053***	-0.0208***
	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)	(0.000)
Divdum	-0.0439***	-0.0282***	-0.0574***	-0.0255***	-0.0255***	-0.0336***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Acquisitions	-0.5514***	-0.6394***	-0.3616***	-0.3146***	-0.5487***	-0.5948***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Net equity Issuance	0.2489***	0.2310***	0.2577***	0.1118***	0.2674***	0.2428***
	(0.000)	(0.000)	(0.003)	(0.003)	(0.000)	(0.000)
Net LT debt Issuance	0.3171***	0.3266***	0.1944***	0.2184***	0.2910***	0.3336***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dqtr2	0.0008	0.0001	0.0006	0.0012	0.0019	0.0004
	(0.479)	(0.945)	(0.811)	(0.478)	(0.424)	(0.781)
dqtr3	0.0021*	0.0014	0.0019	0.0027	0.0023	0.0017
	(0.067)	(0.347)	(0.462)	(0.100)	(0.325)	(0.218)
dqtr4	0.0055***	0.0050***	0.0039	0.0067***	0.0040*	0.0050***
	(0.000)	(0.001)	(0.144)	(0.000)	(0.081)	(0.000)
dum051	0.0259***	0.0248***	0.0252***	0.0244***	-0.0040	0.0287***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.390)	(0.000)
dum052	0.0248***	0.0242***	0.0258***	0.0239***	-0.0061	0.0278***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.170)	(0.000)
dum053	0.0205***	0.0200***	0.0277***	0.0205***	-0.0069	0.0227***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.145)	(0.000)
dum054	0.0246***	0.0237***	0.0262***	0.0209***	0.0024	0.0265***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.627)	(0.000)
dum061	0.0213***	0.0188***	0.0198***	0.0212***	-0.0021	0.0229***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.677)	(0.000)
dum062	0.0233***	0.0227***	0.0181***	0.0151***	-0.0036	0.0263***
	(0.000)	(0.000)	(0.003)	(0.000)	(0.457)	(0.000)
dum063	0.0214***	0.0194***	0.0162***	0.0115***	-0.0023	0.0241***
	(0.000)	(0.000)	(0.004)	(0.005)	(0.627)	(0.000)
dum064	0.0210***	0.0177***	0.0187***	0.0124***	-0.0041	0.0226***
	(0.000)	(0.000)	(0.002)	(0.004)	(0.375)	(0.000)
dum071	0.0266***	0.0234***	0.0171***	0.0137***	-0.0047	0.0301***
	(0.000)	(0.000)	(0.005)	(0.001)	(0.345)	(0.000)
dum072	0.0258***	0.0223***	0.0156***	0.0122***	-0.0064	0.0286***
	(0.000)	(0.000)	(0.008)	(0.003)	(0.182)	(0.000)
dum073	0.0268***	0.0250***	0.0150***	0.0106**	-0.0058	0.0307***
	(0.000)	(0.000)	(0.008)	(0.012)	(0.209)	(0.000)
dum074	0.0259***	0.0250***	0.0102*	0.0094**	-0.0070	0.0299***
	(0.000)	(0.000)	(0.065)	(0.022)	(0.106)	(0.000)
dum081	0.0200***	0.0189***	0.0110**	0.0154***	-0.0110***	0.0221***
	(0.000)	(0.000)	(0.032)	(0.000)	(0.007)	(0.000)
dum082	0.0140***	0.0130***	0.0096*	0.0151***	-0.0138***	0.0152***
	(0.000)	(0.003)	(0.069)	(0.000)	(0.001)	(0.000)
dum083	0.0154***	0.0131***	0.0094*	0.0168***	-0.0054	0.0157***
	(0.000)	(0.005)	(0.058)	(0.000)	(0.170)	(0.000)
dum084	0.0256***	0.0244***	0.0117**	0.0204***	0.0017	0.0279***
	(0.000)	(0.000)	(0.014)	(0.000)	(0.710)	(0.000)
dum091	0.0460***	0.0327**	0.0439***	0.0778***	0.0173	0.0387***
	(0.000)	(0.023)	(0.005)	(0.000)	(0.210)	(0.002)
Constant	0.2913***	0.0373***	0.1549***	0.1415***	0.2046***	0.2083***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	182,301	120,764	10,135	16,828	21,581	143,892
Adjusted R-squared	0.454	0.446	0.431	0.382	0.395	0.450

Panel B: Net Total Debt Issuance

	(1) 1995Q1-2009Q1	(2) Smallest firms	(6) Largest firms	(7) Investment	(8) Speculative	(9) Unrated
lag(dqsize)	-0.0087***	-0.0085***	-0.0113***	-0.0198***	-0.0021	-0.0094***
	(0.000)	(0.000)	(0.004)	(0.000)	(0.584)	(0.000)
lag(OCF)	-0.0094***	-0.0139***	0.0057	0.0242**	0.0166	-0.0113***
	(0.001)	(0.000)	(0.770)	(0.031)	(0.118)	(0.000)
lag(dividends)	0.0820*	-0.0752	0.2592**	0.5385***	0.1661	0.0043
	(0.057)	(0.201)	(0.030)	(0.000)	(0.371)	(0.932)
Dividend dummy	-0.0029***	0.0004	-0.0069***	-0.0074***	-0.0037***	-0.0013**
	(0.000)	(0.529)	(0.000)	(0.000)	(0.005)	(0.015)
lag2(leverage)	-0.0098***	-0.0128***	-0.0118***	-0.0278***	-0.0365***	-0.0120***
	(0.000)	(0.000)	(0.002)	(0.000)	(0.000)	(0.000)
lag_(ngbe)	0.0035***	0.0050***	0.0027	0.0066	-0.0012	0.0063***
	(0.006)	(0.003)	(0.464)	(0.216)	(0.563)	(0.000)
lag2(logMC)	-0.0002**	-0.0003	0.0001	-0.0014***	-0.0026***	-0.0006***
	(0.049)	(0.102)	(0.758)	(0.000)	(0.000)	(0.000)
lag(MB)	0.0019***	0.0019***	0.0007	0.0013**	0.0088***	0.0019***
	(0.000)	(0.000)	(0.108)	(0.018)	(0.000)	(0.000)
lag2(cash)	-0.0158***	-0.0168***	-0.0166***	-0.0224***	-0.0161***	-0.0151***
	(0.000)	(0.000)	(0.006)	(0.000)	(0.005)	(0.000)
lag2(STdebt)	-0.0295***	-0.0278***	-0.0147	-0.0224***	-0.0123	-0.0290***
	(0.000)	(0.000)	(0.221)	(0.009)	(0.174)	(0.000)
lag(R&D)	-0.0188*	-0.0085	-0.0472	-0.0408	-0.2986***	-0.0124
	(0.062)	(0.436)	(0.366)	(0.430)	(0.000)	(0.231)
lag(capex)	0.3138***	0.2997***	0.3204***	0.2746***	0.4637***	0.2853***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dqtr2	-0.0013**	0.0000	-0.0003	-0.0013	-0.0016	-0.0009
	(0.018)	(0.950)	(0.862)	(0.392)	(0.393)	(0.121)
dqtr3	0.0000	0.0013**	0.0004	0.0004	-0.0025	0.0006
	(0.970)	(0.040)	(0.811)	(0.792)	(0.172)	(0.300)
dqtr4	-0.0037***	-0.0026***	-0.0037**	-0.0035**	-0.0029	-0.0035***
	(0.000)	(0.000)	(0.028)	(0.017)	(0.124)	(0.000)
dum051	-0.0039***	-0.0023	-0.0094***	-0.0064**	-0.0095***	-0.0027**
	(0.001)	(0.118)	(0.008)	(0.041)	(0.005)	(0.034)
dum052	-0.0031***	-0.0029**	-0.0029	-0.0056**	-0.0026	-0.0030**
	(0.005)	(0.040)	(0.466)	(0.028)	(0.492)	(0.015)
dum053	-0.0018	-0.0025*	0.0016	0.0033	-0.0021	-0.0027**
	(0.110)	(0.083)	(0.696)	(0.357)	(0.515)	(0.033)
dum054	-0.0004	-0.0022	0.0011	0.0021	-0.0059*	-0.0003
	(0.722)	(0.155)	(0.691)	(0.472)	(0.087)	(0.831)

|						
dum061	-0.0030***	-0.0014	-0.0021	-0.0068***	-0.0028	-0.0029**
	(0.006)	(0.333)	(0.606)	(0.007)	(0.466)	(0.019)
dum062	-0.0003	-0.0025*	0.0055	0.0035	-0.0024	-0.0009
	(0.797)	(0.089)	(0.170)	(0.213)	(0.481)	(0.507)
dum063	-0.0006	-0.0007	-0.0035	-0.0026	0.0031	-0.0013
	(0.568)	(0.613)	(0.265)	(0.334)	(0.418)	(0.284)
dum064	0.0015	0.0020	0.0015	0.0005	0.0029	0.0008
	(0.240)	(0.246)	(0.624)	(0.868)	(0.441)	(0.601)
dum071	-0.0008	0.0005	-0.0058**	-0.0037	-0.0001	-0.0009
	(0.529)	(0.758)	(0.015)	(0.171)	(0.982)	(0.508)
dum072	0.0029**	0.0022	0.0048	0.0023	0.0084*	0.0015
	(0.024)	(0.187)	(0.173)	(0.436)	(0.052)	(0.286)
dum073	0.0004	-0.0010	0.0009	0.0047*	-0.0032	0.0004
	(0.755)	(0.539)	(0.778)	(0.069)	(0.392)	(0.804)
dum074	0.0037***	0.0020	0.0048*	0.0086**	-0.0016	0.0038**
	(0.006)	(0.252)	(0.077)	(0.010)	(0.670)	(0.015)
dum081	0.0008	0.0027*	-0.0046*	-0.0012	-0.0046	0.0023*
	(0.479)	(0.079)	(0.058)	(0.632)	(0.105)	(0.089)
dum082	-0.0009	-0.0003	0.0018	0.0033	-0.0068***	-0.0001
	(0.381)	(0.848)	(0.491)	(0.174)	(0.005)	(0.961)
dum083	-0.0003	-0.0004	-0.0031	-0.0000	-0.0030	0.0005
	(0.822)	(0.805)	(0.174)	(0.995)	(0.298)	(0.710)
dum084	-0.0052***	-0.0059***	0.0014	-0.0001	-0.0117***	-0.0045***
	(0.000)	(0.000)	(0.650)	(0.969)	(0.000)	(0.000)
dum091	-0.0129***	-0.0092***	-0.0099***	-0.0107***	-0.0238***	-0.0103***
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Constant	0.0082***	0.0079***	0.0064	0.0248***	0.0282***	0.0095***
	(0.000)	(0.000)	(0.122)	(0.000)	(0.000)	(0.000)
Observations	182,604	118,572	11,470	18,673	22,741	141,190
Adjusted R-squared	0.018	0.018	0.020	0.022	0.041	0.017

Panel C: Net Equity Issuance

	(1) 1995Q1- 2009Q1	(2) Smallest firms	(6) Largest firms	(7) Investment	(8) Speculative	(9) Unrated
lag(dqsize)	-0.0002	-0.0041**	0.0091***	0.0097***	0.0092***	-0.0021
	(0.890)	(0.018)	(0.000)	(0.000)	(0.000)	(0.167)
lag(OCF)	-0.0737***	-0.0726***	-0.0333***	-0.0307***	-0.0235***	-0.0726***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
lag(dividends)	-0.5862***	-0.6322***	-0.2162***	0.0214	0.0386	-0.6028***
	(0.000)	(0.000)	(0.000)	(0.620)	(0.779)	(0.000)
Dividend dummy	0.0014***	0.0006	0.0001	-0.0003	-0.0008	0.0011**
	(0.000)	(0.272)	(0.892)	(0.409)	(0.279)	(0.011)
lag2(leverage)	0.0118***	0.0040***	0.0142***	0.0158***	0.0048***	0.0085***
	(0.000)	(0.004)	(0.000)	(0.000)	(0.009)	(0.000)
lag(ngbe)	-0.0016	-0.0002	-0.0018	-0.0092***	-0.0024**	0.0008
	(0.159)	(0.913)	(0.182)	(0.000)	(0.043)	(0.641)
lag2(logMC)	-0.0036***	-0.0042***	-0.0008***	-0.0004***	-0.0012***	-0.0043***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
lag(MB)	0.0099***	0.0117***	-0.0006**	-0.0017***	0.0054***	0.0108***
	(0.000)	(0.000)	(0.035)	(0.000)	(0.000)	(0.000)
lag2(cash)	-0.0199***	-0.0224***	-0.0025	-0.0129***	-0.0023	-0.0201***
	(0.000)	(0.000)	(0.556)	(0.000)	(0.520)	(0.000)
lag2(STdebt)	0.0015	0.0077***	-0.0157***	-0.0156***	0.0023	0.0027
	(0.476)	(0.004)	(0.000)	(0.000)	(0.599)	(0.266)
lag(R&D)	0.3464***	0.3464***	0.1109***	0.1260***	0.0105	0.3434***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.781)	(0.000)
lag(capex)	0.1432***	0.1617***	0.1025***	0.0411***	0.0969***	0.1523***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dqtr2	-0.0008	-0.0008	-0.0002	-0.0000	-0.0004	-0.0007
	(0.107)	(0.237)	(0.741)	(0.949)	(0.717)	(0.252)
dqtr3	-0.0029***	-0.0030***	-0.0019***	-0.0016***	-0.0018*	-0.0030***
	(0.000)	(0.000)	(0.005)	(0.001)	(0.083)	(0.000)
dqtr4	-0.0005	-0.0001	-0.0009	-0.0003	-0.0014	-0.0002
	(0.323)	(0.899)	(0.147)	(0.447)	(0.177)	(0.683)
dum051	0.0001	-0.0004	-0.0021**	-0.0004	-0.0029*	-0.0002
	(0.922)	(0.805)	(0.035)	(0.642)	(0.056)	(0.870)
dum052	-0.0016*	-0.0015	-0.0033***	-0.0029***	-0.0022	-0.0020*
	(0.085)	(0.281)	(0.006)	(0.004)	(0.127)	(0.093)
dum053	0.0028***	0.0037**	-0.0016	-0.0017*	-0.0004	0.0033**
	(0.006)	(0.014)	(0.143)	(0.081)	(0.782)	(0.012)
dum054	0.0005	0.0014	-0.0025**	-0.0022**	-0.0000	0.0003

|					
	(0.636)	(0.390)	(0.044)	(0.028)	(0.990)	(0.843)
dum061	0.0028**	0.0041**	-0.0030**	-0.0017	-0.0043***	0.0039***
	(0.013)	(0.016)	(0.020)	(0.113)	(0.000)	(0.008)
dum062	-0.0025**	-0.0013	-0.0044***	-0.0083***	-0.0045***	-0.0023
	(0.019)	(0.442)	(0.010)	(0.000)	(0.006)	(0.104)
dum063	-0.0022***	-0.0028**	-0.0054***	-0.0058***	-0.0037***	-0.0025**
	(0.009)	(0.026)	(0.000)	(0.000)	(0.009)	(0.022)
dum064	0.0021*	0.0030*	-0.0026***	-0.0023**	-0.0034**	0.0030**
	(0.069)	(0.093)	(0.005)	(0.025)	(0.025)	(0.045)
dum071	-0.0018*	-0.0025*	-0.0049***	-0.0056***	-0.0013	-0.0024**
	(0.066)	(0.084)	(0.000)	(0.000)	(0.584)	(0.042)
dum072	0.0018	0.0053***	-0.0070***	-0.0064***	-0.0041**	0.0035**
	(0.129)	(0.005)	(0.000)	(0.000)	(0.023)	(0.026)
dum073	-0.0009	0.0003	-0.0069***	-0.0087***	-0.0046**	0.0000
	(0.424)	(0.850)	(0.000)	(0.000)	(0.013)	(0.984)
dum074	-0.0023**	-0.0016	-0.0051***	-0.0055***	-0.0026	-0.0025*
	(0.040)	(0.344)	(0.000)	(0.006)	(0.129)	(0.084)
dum081	-0.0069***	-0.0082***	-0.0059***	-0.0074***	-0.0067***	-0.0080***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
dum082	-0.0026***	-0.0043***	-0.0012	-0.0025**	-0.0032***	-0.0036***
	(0.000)	(0.000)	(0.352)	(0.024)	(0.006)	(0.000)
dum083	-0.0014*	-0.0029**	-0.0015	-0.0030***	-0.0039***	-0.0018*
	(0.061)	(0.011)	(0.114)	(0.001)	(0.000)	(0.066)
dum084	-0.0043***	-0.0083***	0.0001	-0.0007	-0.0013	-0.0066***
	(0.000)	(0.000)	(0.913)	(0.300)	(0.360)	(0.000)
dum091	0.0007	-0.0018*	0.0008	0.0021***	-0.0021**	-0.0002
	(0.251)	(0.065)	(0.363)	(0.006)	(0.020)	(0.787)
Constant	0.0061***	0.0061***	0.0036**	0.0009	0.0028	0.0075***
	(0.000)	(0.000)	(0.021)	(0.316)	(0.127)	(0.000)
Observations	184,186	119,498	11,589	18,786	22,986	142,414
Adjusted R-squared	0.117	0.123	0.085	0.076	0.024	0.123

Figure 1: Cash/Assets by Size Groupings

We use NYSE cutoffs for firm size quintiles and normalize the average cash/assets ratio to 1 at the start of the credit boom. Sizerank = 0 (4) are the smallest (largest) firms.
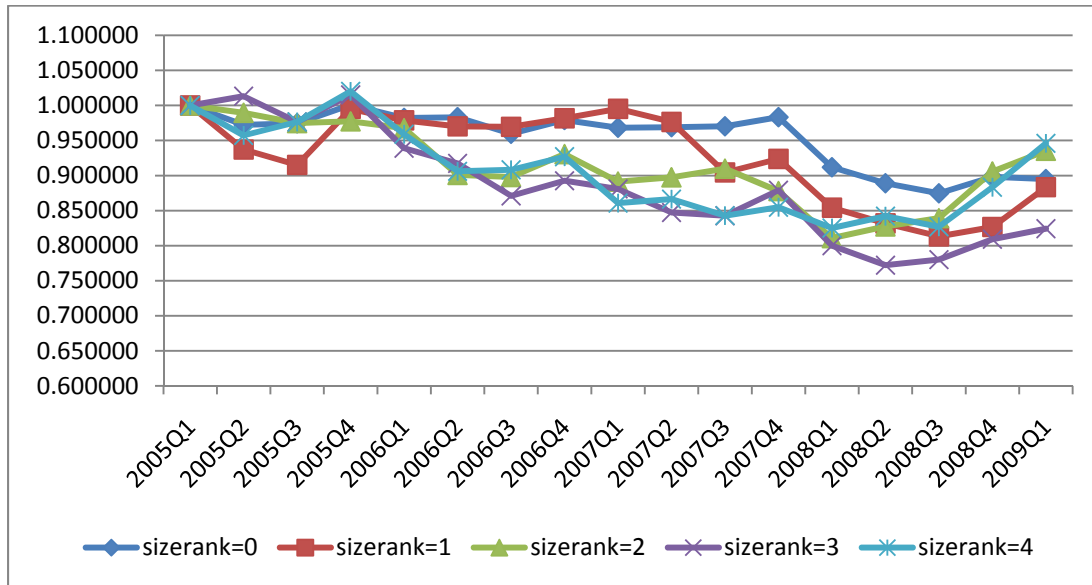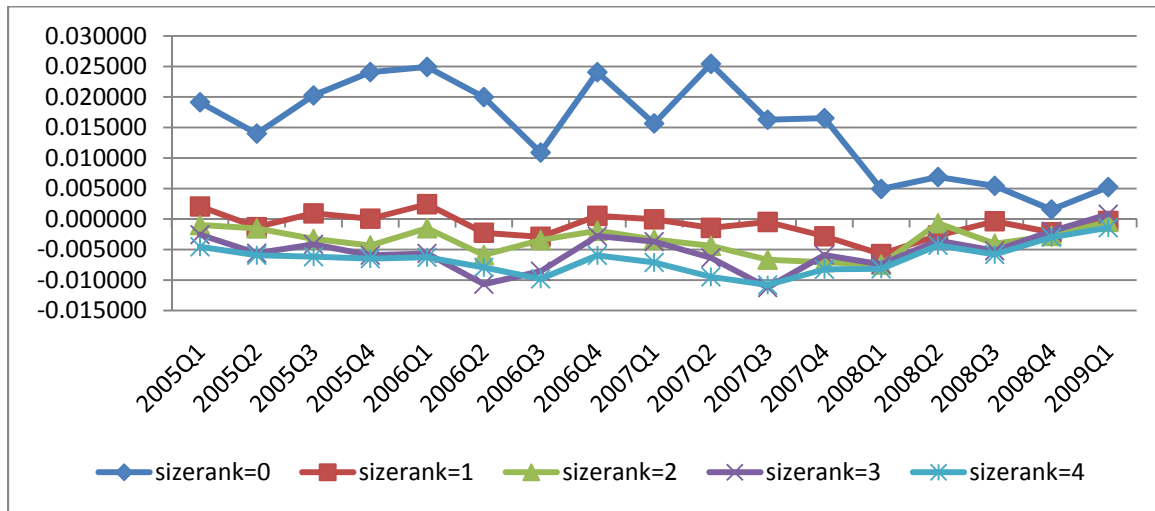

Figure 2: Net Debt Issuance by Size Groupings

We use NYSE cutoffs for firm size quintiles. Sizerank = 0 (4) are the smallest (largest) firms.
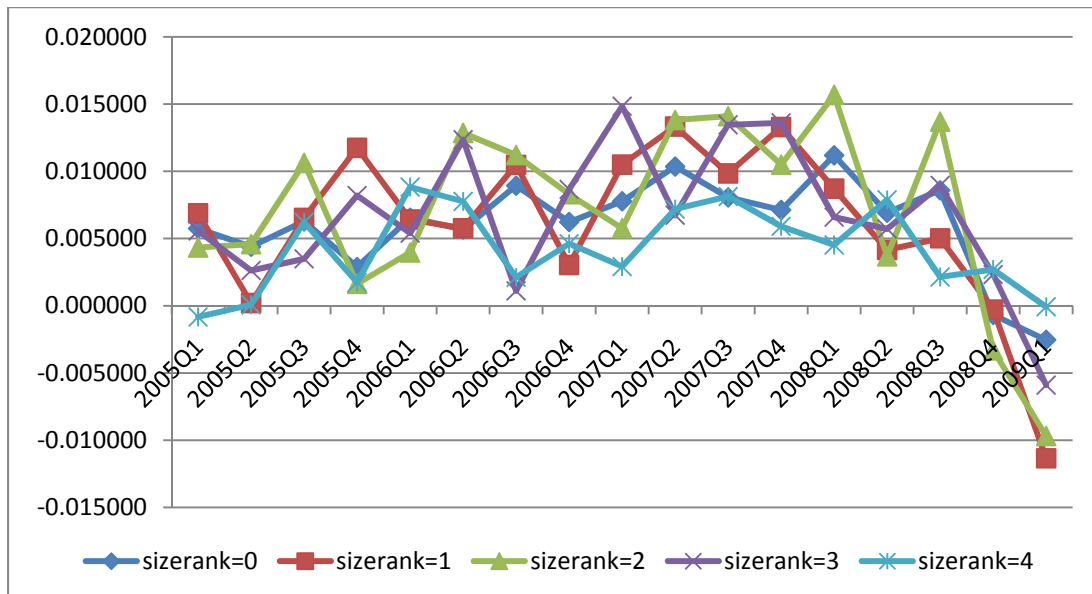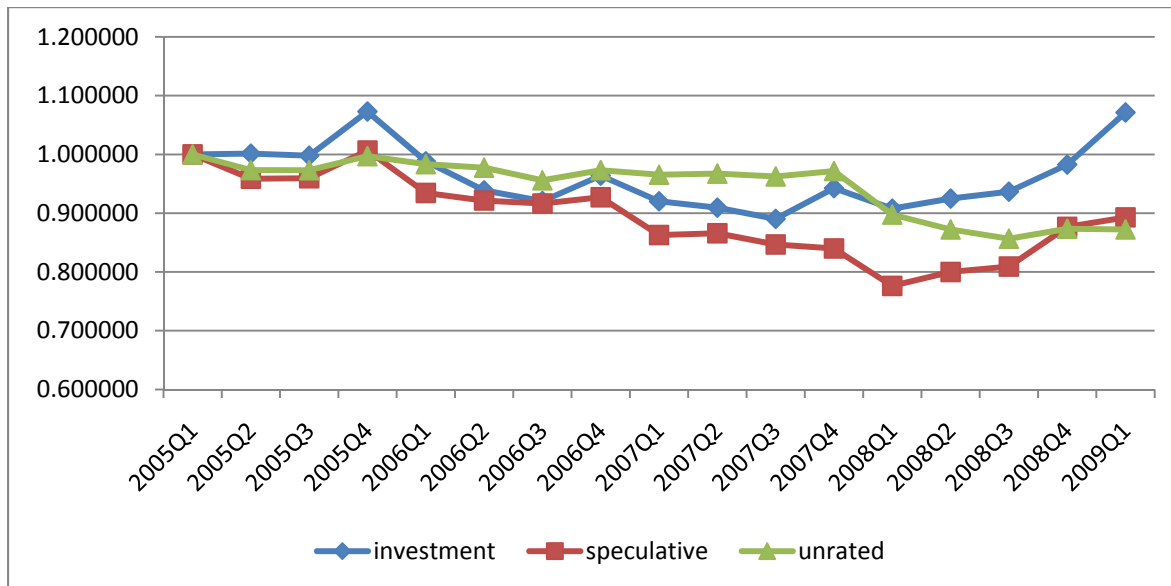
Figure 3: Net Equity Issuance by Size Groupings

We use NYSE cutoffs for firm size quintiles. Sizerank = 0 (4) are the smallest (largest) firms.

**Figure 4: Cash/Assets by Rating Groupings**

We divide firms quarterly into firms with an investment grade rating, a speculative rating, and no rating using the S&P long-term rating (*splticrm*) available on Compustat.

Figure 5: Forecasted Net Debt and Equity Issuance

We first estimate the models in Panels B and C of Table 5 from the first quarter of 1995 to the fourth quarter of 2004 and then use these models to forecast net debt and net equity issuance from the first quarter of 2005 to the end of the sample. To assess the role of the increase in credit spreads on debt and equity issuance, we estimate the regressions both with and without the intermediate term treasury rate and the credit spread of high yield debt over the intermediate term treasury rate.

Figure 5a: Forecasted Net Debt Issuance

Figure 5b: Forecasted Net Equity Issuance
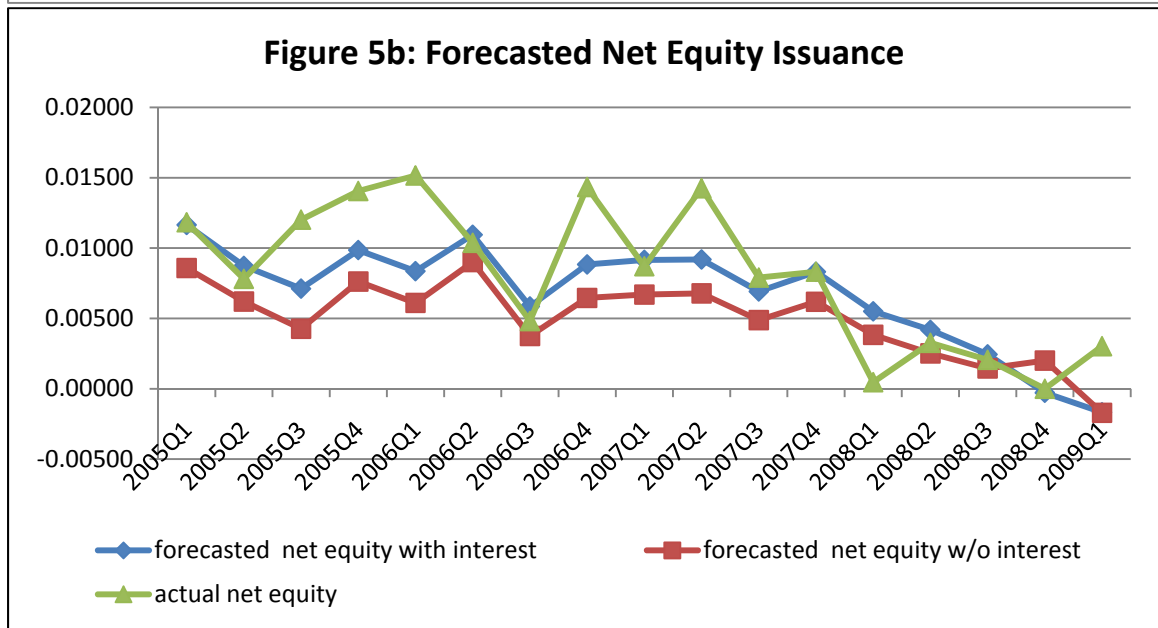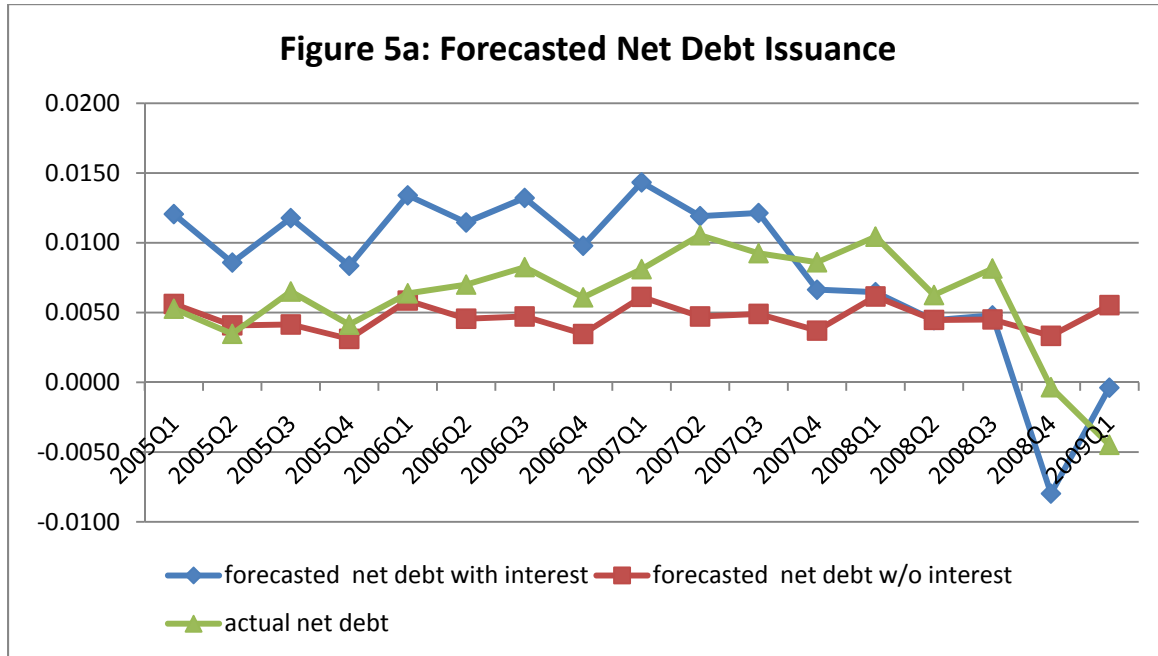
Appendix

All variables are quarterly, unless otherwise noted. For variables reported on a year-to-date basis, the quarterly value is calculated by subtracting the lagged value from the current value; in the first quarter of a fiscal year, the lagged value is set equal to zero. Variables names preceded by "lag" are the value of that variable in the previous quarter; variable names preceded by lag2 are the value of that variable two quarters prior.

Variable name	Description
Acquisitions	acquisitions (*acqy*) divided by assets
Avgtint	average of monthly intermediate term treasuries during the quarter
Capex	capital expenditures *(capxy)* / lagged assets
Cash	cash and marketable securities (*cheq*) divided by assets
Dividend dummy	dummy variable equal to one if firm paid dividends
Dividends	total cash dividends (*dvy*) minus preferred dividends (*dvpq*) paid during the quarter, divided by lagged assets
Dqsize	assets minus lagged assets, divided by lagged assets
HYspread	spread of Merrill Lynch US High Yield 100 Index over intermediate term treasuries, averaged over each month of the quarter
Leverage	long-term debt (*dlttq*) plus debt in current liabilities (*dlcq*), divided by assets (*atq*)
logMC	log (market value of equity)
MB	market-to-book calculated as book value of assets (*atq*) minus book value of common equity (*ceqq*) plus the market value of common equity (*cshoq*prccq*)
Mkt lev	long-term debt (*dlttq*) plus debt in current liabilities (*dlcq*), divided by long-term debt (*dlttq*) plus debt in current liabilities (*dlcq*) plus the market value of common equity
Net equity Issuance	equity issuance (*sstky*) minus aggregate equity repurchase (*prstkcy*), divided by lagged assets
Net LT debt Issuance	long-term debt issuance (*dltisy*) minus long-term debt retirement (*dltry*) divided by lagged assets
Net total debt issuance	change in long-term debt (*dlttq*) and debt in current liabilities (*dlcq*) during the quarter, divided by lagged assets
NgBE	dummy variable equal to one if book equity (*ceqq*) is less than 0
NWC	working capital (*wcapq*) minus cash, divided by assets

Variable name	Description
OCF (operating cash flow)	Operating cash flow calculated following Minton and Schrand (1999) as sales (*saleq*) less cost of goods sold (*cogsq*) less selling, general and administrative expenses (*xsgaq*) less the change in working capital for the period, divided by total assets (*atq*). Working capital is current assets other than cash and short-term investments less current liabilities and is calculated as the sum of the non-missing amounts for accounts receivable (*rectq*), inventory (*invtq*), and other current assets (*aco*q) less the sum of the non-missing amounts for accounts payable (*apq*), income taxes payable (*txpq*), and other current liabilities (*lcoq*). If all components of working capital are missing in either the current quarter or the previous quarter, working capital and operating cash flow are both set equal to missing. Quarterly selling, general and administrative expenses exclude one-quarter of annual research and development costs (*xrd*) and advertising expenses (*xad*) when those data items are available.
PPE	PPE (*ppentq*) divided by assets
R&D	R&D (*xrdq*) / assets. If R&D is reported annually, then quarterly R&D is set equal to one-fourth of annual R&D. If R&D is missing, it is set equal to 0.
Rated	dummy variable equal to one if the S&P long-term rating (*splticrm*) available on Compustat is investment grade or speculative
Rdmiss	dummy variable equal to one if R&D is missing in Compustat
Sigma12	the median of the standard deviations of cash flow/assets over past 12 quarters for firms in the same industry, as defined by two-digit SIC code.
Size	log (book value of assets in 2009 dollars)
STDebt	change in debt in current liabilities (*dlcq*), divided by lagged assets