Bank Loan Supply, Lender Choice, and Corporate Capital Structure

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December 28, 2005

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Abstract

Do credit market conditions affect corporate capital structures? In an attempt to answer this question, I study two natural experiments that affect corporate access to bank credit: the 1961 expansion of bank credit due to the emergence of the market for CDs, and the contraction associated with the 1966 credit crunch. I document several capital structure reactions to these changes in credit market liquidity. First, relative to firms with public debt market access, the leverage ratios of bank-dependent firms decrease (increase) following a contraction (expansion) of bank credit. Second, firms alter the composition of financing sources in response to tight credit. Bank-dependent firms shift towards equity when bank debt is scarce. Non-bank-dependent firms shift between bank debt and public debt markets. These results indicate that observed leverage ratios and debt placement structures are not determined solely by changes in firms' demand for capital structures. Rather, supply frictions in the credit markets are an important determinant of corporate capital structures, particularly for bank-dependent firms. Thus, the same capital market imperfections that create a link between the banking sector and economic growth also create a link between credit conditions and firms' financial structures.

1 Introduction

Do shocks to particular suppliers of capital affect corporate capital structure decisions? Previous research has shown that frictions in the credit creation process lead to fluctuations in the supply of bank loans.[1] Further, the presence of informational asymmetries creates variation in firms' access to non-bank capital sources. One implication of these findings that has received a lot of attention in the literature on business cycle propagation is that firms with limited access to non-bank capital will at times become capital constrained.[2] A more general implication, though, is that the cross-sectional variation in firms' financial structures will reflect not only firm characteristics, but recent credit conditions. However, such effects have been largely overlooked in studies of the determinants of corporate capital structure.

This paper helps to fill this gap by studying the impact of shifts in the supply of bank loans on the capital structures of firms, conditional on varying degrees of access to public markets. To do so, I employ the emergence of the market for negotiable certificates of deposit (CDs) in 1961 and the credit crunch of 1966 as natural experiments representing, respectively, a loosening and a tightening of frictions in the flow of capital through the banking system.

I document that changes in supply frictions have a significant impact on the leverage ratios, issuance choices, and the mix of debt sources of small, bank-dependent firms, relative to firms with public market access. I also demonstrate that taking credit supply movements into account can help deepen our understanding of corporate financial policy.

The expected response to a bank loan supply shock depends on a firm's access to

[1] Examples include monetary shocks (Kashyap, Stein and Wilcox (1993, 1996), Gertler and Gilchrist (1994), and Hoshi, Scharfstein and Singleton (1993)), bank asset devaluation (Hancock and Wilcox (1998) and Peek and Rosengren(1991)), and regulatory changes (Berger and Udell (1994)).

[2] See, for example, Gertler and Hubbard (1989), Kashyap, Lamont and Stein (1994), and Gertler and Gilchrist (1994) among others.

different segments of the capital markets. For example, when faced with a contraction in loan supply, firms with access to public debt markets are expected to substitute away from bank debt towards public debt. This will obviously affect these firms' debt placement structures, but also may affect their leverage ratios for several reasons. First, the transaction costs associated with floating public debt imply firms will issue larger amounts (Stafford (2001)) and retire less frequently (Leary and Roberts (2005)). Second, Calomiris, Himmelberg and Wachtel (1995) show that following a monetary tightening, large firms issue more commercial paper in order to extend more trade credit to smaller firms, whose access to public markets is limited. Thus, all else equal, one would expect these firms' leverage ratios to be negatively correlated with bank supply movements.

Firms without access to public debt markets, on the other hand, will need to find alternate sources of capital to avoid capital constraints when loan supply decreases. These may include internal funds, external equity, trade credit or non-bank private debt. With the exception of the last possibility, all of these substitutions would result in relatively lower (higher) leverage following a loan supply contraction (expansion).

I begin by showing that, consistent with these predictions, the leverage of small, bank-dependent firms rises (falls) relative to large, less bank-dependent firms following positive (negative) loan supply shocks. Results are similar whether one considers total leverage or just the long-term debt to assets ratio. Further investigation shows that these leverage changes are not simply associated with differences in asset growth but result from differences in net debt and equity issuance activity. Conditional on an issuance, small firms are less (more) likely to issue equity rather than debt, following positive (negative) changes in loan availability. This also suggests that small firms mitigate capital constraints through greater reliance on external equity in times of limited bank debt availability, consistent with Faulkender and Petersen's (2005) finding that firms without access to public debt markets pay out lower net dividends.

If these leverage changes are caused by changes in bank loan availability, they should be accompanied by relative shifts in the composition of debt finance. Consistent with this prediction, I show that the mix of long-term bank debt to total long-term debt increases

(decreases) for small, bank-dependent firms, relative to firms with public market access, following positive (negative) loan supply shocks. Additionally, the use of public debt by firms with access to public markets increases, relative to that of small firms, following the 1966 Credit Crunch. These results suggest that bank loan supply movements are an important determinant of variation in firms' debt placement structures.

Finally, I use several examples to demonstrate that consideration of supply-side credit market effects can enrich our understanding of corporate capital structure changes. First, recent studies by Brav (2005) and Faulkender and Petersen (2005) have demonstrated that access to public financial markets can impact leverage ratios. While Faulkender and Petersen demonstrate that bank-dependent firms on average have lower leverage ratios than firms with public market access, I show that the magnitude of this effect depends significantly on the tightness of credit market conditions.

Second, my findings have implications for how we study the relationship between interest rates and debt sources or debt issuance timing. For example, Diamond (1991) predicts that the ratio of bank to non-bank debt should be positively related to interest rates. As Stein (1998) discusses, though, when interest rate movements are associated with changes in the availability of bank loans (i.e. credit crunches or monetary shocks), one would expect the opposite. Cantillo and Wright (2000) present firm-level evidence consistent with Diamond's prediction. However, data from the time period studied here shows evidence consistent with both predictions. That is, the ratio of bank to non-bank debt is positively correlated with interest rates over the sample period as a whole. However, for events such as the credit crunches of 1966 and 1969, when interest rate increases accompany shocks to loan supply, the ratio of bank to non-bank debt falls for small firms relative to large firms. This suggests that in order to fully understand the relation between interest rates and debt source, we need to consider both the macroeconomic environment as well as the differential effects on bank dependent and non-dependent firms.

Third, survey evidence by Graham and Harvey (2001) and recent empirical findings by Barry et al. (2005) suggest that managers routinely time debt issuances to periods when

interest rates are low relative to recent historical rates. This behavior seems opposite to the experience of the late 1960s, however, when many firms issued public debt in a period of historically high interest rates at least in part as a reaction to the limited availability of bank loans. In fact, I show that the evidence for historical (or "backward-oriented") interest rate timing documented by Barry et al (2005) reverses during the 1960s, a period with two episodes where significant non-price credit rationing accompanied rising interest rates.[3] This shows that while "backward-oriented" debt market timing may be common, it does not always offer a good description of how firms choose the timing of their debt issues.

There are several possible reasons why loan supply movements have not received much attention in the capital structure literature, which help to frame this paper's contributions. First, most capital structure research seeks to explain lender choice and leverage ratios with factors that measure firms' demands for different capital structures (i.e. the costs and benefits of various types of finance). However, Titman (2002) calls for a renewed interest in "the supply-side effects that arise when imperfections exist in the capital markets." For example, as discussed by Titman, one type of supply factor arises when investor preferences for holding different types of securities change. Faulkender and Petersen (2005) study a somewhat different supply factor, namely the costliness (or incompleteness) of the information gathering and monitoring services provided by intermediaries, which makes debt capital more expensive for informationally opaque firms.

My paper contributes to this recent literature by studying the capital structure effects of an additional supply-side factor, restrictions on the availability of loanable funds in the banking system. In doing so, I provide further support for the role of supply factors as important determinants of corporate capital structures. My results also deepen our understanding of how supply factors influence capital structures. Not only do bank-dependent firms bear the cost of intermediation, but fluctuations in banks' access to loanable funds lead to further changes in firms' financing decisions.

Second, while capital structure research often focuses on firms' long-term financing

[3]See Owens and Schreft (1993)

choices, bank loan supply shocks are commonly thought to affect primarily short term financing and investment activities. For example, previous work has shown that monetary policy shocks affect the mix of outstanding short-term debt (maturity less than one year) between bank loans and commercial paper (Kashyap, Stein and Wilcox (1993)), as well as the inventory investment of small firms relative to large firms (Kashyap, Lamont and Stein (1994)). However, there are several reasons to believe supply movements should impact long-term financing as well. First, studies by Houston and James (1996) and Johnson (1997) have shown that bank debt represents a significant portion of firms' long-term debt financing. As of the end of the sample period studied here, term loans represented over 38 percent of commercial and industrial loans made by Federal Reserve member banks, and almost 65 percent of business loans at New York City banks.[4] Second, several studies have shown that loan supply shocks influence long term investments such as business fixed investment (Hoshi, Scharfstein, and Singleton (1993)) and automobile purchases (Ludvigson (1996)). However, little evidence has been documented on the influence of bank supply shocks on firms' long-term capital structures.[5] A further contribution, then, is that I document that changes in the availability of bank loans, even when temporary, can affect firms' long-term financing decisions.

The remainder of the paper is organized as follows. Section 2 provides some background on the historical events I use for my natural experiments. Section 3 discusses the empirical hypotheses and strategy as well as the data sources. Results for the impact of these events on leverage ratios and debt placement structure are presented in Section 4. Section 5 explores the implications of these findings for several recent capital structure studies. Section 6 concludes.

[4]Klebaner (1990)

[5]One exception is Cantillo and Wright (2000), who show that changes in bank profitability affect the ratio of public bonds to total long-term debt. However, they do not consider the differential effects on large and small firms or total leverage ratios.

2 Credit Market Background

2.1 1961: The emergence of the bank CD

As discussed by Mishkin (2003), before the 1960s banks viewed their liabilities as essentially fixed. Therefore, banks attempted to meet the increasing demand for corporate term loans in the mid to late 1950s by selling off government securities and other assets. Without the ability to grow their liability base, however, banks became increasingly unable to keep pace with loan demand. As described in the 1959 annual report of First National City Bank of New York (later Citibank):[6]

> The extent to which banks can liquidate investments for the purpose of adding to loanable funds is limited. In addition to the cash reserves required by law, we must always hold quickly convertible assets sufficient to meet temporary deposit downswings, with a good margin for the unforseen, and we must have substantial amounts of government securities to pledge against deposits of public bodies as required by law. Except as deposits increase, these requirements impose an approximate ceiling on lending capacity.

As Wojnilower (1980) discusses, prior to the emergence of bank CDs, bank-dependent firms were often constrained in their access to capital because "their 'lead' banks remained essentially dependent on narrow local deposit markets" (p. 284).

In an effort to ease this constraint, the first large denomination, negotiable certificate of deposit was issued by First National in February of 1961. The negotiability of this instrument, combined with the agreement of a government securities dealer, The Discount Corporation of New York, to make a secondary market for such instruments, led to a surge in their use shortly after (Roussakis (1997)). Large denomination CDs at the Federal Reserve System's weekly reporting banks rose from less than $1 billion in 1961 to $26.1 billion in 1970, where this latter amount represented 32% of the outstanding commercial and industrial loans (Friedman 1975).

[6] See Cleveland and Huertas (1985)

This new financing instrument allowed banks to bid for capital from a much broader base of investors and, therefore, allowed them to expand their loan portfolios. As described by Cleveland and Huertas (1985), in their history of Citibank:

> The CD ... would solve the funding problem, thereby opening the way to faster growth. Instead of matching loan commitments to the supply of bonds that could be sold, banks would now be able to book loans they thought profitable, knowing the funds would be available in the market at a price.

At the same time, effective January 1, 1962, the Federal Reserve increased the Regulation Q interest rate ceilings on savings and short term time deposits by 50 basis points and by 100 basis points on time deposits with maturity at least one year (Reierson 1962). Although these ceilings were not yet binding, this further increased banks' ability to compete for deposits. As a result, the growth rate in time deposits at commercial banks rose from 7.0 percent over the 1950's to 15.4 percent from 1961 to 1965 (Friedman 1975).

2.2 The 1966 Credit Crunch

I now turn from an event representing an expansion of the supply of bank loans to one representing a contraction. According to Kashyap, Stein and Wilcox (1993) the Credit Crunch of 1966 represented "one of the most significant periods of tight credit in the post-WWII period." (p. 85) The term "Credit Crunch" is often used to refer to the relatively brief period in the third quarter of 1966 in which Regulation Q interest rate ceilings became binding for the first time, causing a sharp withdrawal of funds from banks and a subsequent liquidity crisis in the municipal bond markets as banks sought to rebalance their portfolios. However, this period can be seen as the pinnacle of a longer period lasting for at least half that year in which governmental pressure constrained bank loan supply. (See Owens and Schreft (1993) and Burger(1969) for helpful reviews of this episode.)

Owens and Schreft (1993) argue that such government "jawboning" was a more important factor than interest rate ceilings in slowing loan growth during this period. They

appeal to quotes from various government and bank industry documents in making this case. For example, in Feb. 1966, President Johnson "stated that he was counting on the Fed to prevent excessive credit flows from generating inflation." That same month, Fed Board Governor Sherman Maisel said that "banks may have to fight inflation by refusing credit to customers who in other circumstances would be welcomed." At the March 1, 1966 FOMC meeting, members agreed to meet with bankers in their district to discuss the necessity for credit restraint through nonprice rationing. A mid-1966 American Bankers Association publication stated that "The period ahead is not going to be an easy one for banks...we are going to have to restrain the expansion of credit...The Administration has urged bankers to use credit rationing as a device to supplement interest rate increases as a means of limiting credit expansion." The report also recommended that banks reduce loan demand by deferring loan requests and encouraging borrowers to find other sources of funds.

In July 1966, the Fed allowed, for the first time, Regulation Q interest rate ceilings on CD's to become binding, resulting in an outflow of funds from banks (disintermediation). Banks tried to respond by selling off government and municipal securities, creating a liquidity crisis in these bond markets. In August, large commercial banks' holdings of business loans fell by $668 million. In September, 1966, The Federal Reserve Board sent a letter to member banks urging banks to slow the growth of their business loan portfolios and threatening to limit discount window access for banks that did not.

By October 1966, bank credit growth had slowed and credit conditions were more relaxed. Therefore, I initially define an event window of 1966:Q2-Q3, consistent with the definition in Owens and Schreft (1993). As I will discuss later, however, the impact of the event on financing decisions seemed to persist after the official crunch had ended, as those firms that were able to acted to reduce their exposure to similar future episodes.

Several aspects of this episode make it particularly suitable for studying the impact of a reduction in the supply of bank loans. First, unlike later monetary tightenings accomplished via open market operations, the use of Regulation Q ceiling rates, as well as the pressure exerted by the Fed on bankers to limit the expansion of credit, made this

tightening clearly associated with frictions that limit the ability of banks to access capital and extend credit. In addition, this episode is unique even relative to later instances of binding interest rate ceilings. For one, the Eurodollar market provided an alternate source of funds for banks when Regulation Q ceilings became binding again in the 1970s. In 1966, however, this market was still in its infancy, so banks were less able to circumvent the interest rate ceilings. Second, this episode likely came more as a surprise to banks and firms than later episodes, since previously each time the interest rate ceilings became close to binding, the Fed stepped in to raise the ceiling (Burger (1969)). This was the first time the Fed chose to allow the ceiling to bind as a monetary policy tool.

3 Empirical Hypotheses and Strategy

3.1 Empirical Hypotheses

In order for the changes described above in the amount of credit flowing through the banking system to influence leverage ratios, firms must not be able to freely and costlessly substitute among debt sources. This is in keeping with the view of banks as lenders with unique capabilities in information collection, monitoring and renegotiation, who therefore specialize in providing capital to informationally opaque firms.[7] Thus, relatively transparent firms access public capital markets while those that face greater information problems are limited to private debt and equity markets.

In addition, loans must not be perfect substitutes for other assets held by banks, so that, for example, an outflow of deposits leads to a reduction in loan supply, not simply a rebalancing of bank portfolios. This assumption is reasonable, given the regulatory scrutiny of the risk of banks' asset portfolios, and is consistent with theoretical models such as Bernanke and Blinder (1988) and the empirical evidence in Kashyap, Stein and Wilcox (1993).

Given these assumptions, then, one would expect a loan supply shift to have different effects on bank-dependent firms and firms with public market access. The exact

[7]Diamond (1984, 1991), Fama (1985), James (1987), Rajan (1992)

mechanism through which this occurs will depend on the nature of the market clearing mechanism for bank loans. That is, if loan markets clear by price, as modelled by Bernanke and Blinder (1988), then a deposit outflow will lead to an increase in the interest rate on bank loans relative to that on non-bank debt. In this case, small firms will borrow less, since they face a higher cost of debt capital, while large firms will be less affected since they are able to substitute toward relatively less expensive public debt. Alternatively, as described by Stiglitz and Weiss (1981) and Jaffee and Russell (1976), if adverse selection and moral hazard costs are increasing in the interest rate charged, loan markets may clear through quantity rationing. In this case, a decrease in loan supply will increase the degree of rationing for the marginal risk class of firms. Consistent with the conclusions of Holmstrom and Tirole (1998), bank loans will then be less available for small firms, while the loan availability for the largest firms, which are perceived as least risky, will be relatively unaffected. Such an outcome is also likely to result from the regulatory supervision of bank portfolios. That is, if a banker has less money to lend, she is likely to first cut the banks riskiest loans when the bank is concerned about meeting standards for the riskiness of its loan portfolio.

In either case, then, the empirical predictions for the relative leverage behavior of the two groups of firms will be the same, as summarized by the following hypothesis.

Hypothesis 1 *Relative to firms with access to public debt markets, the leverage of bank-dependent firms will increase (decrease) following the emergence of the CD market in 1961 (1966 Credit Crunch).*

Turning to firms' debt placement structures, the predicted changes in the mix of bank and non-bank debt sources for small firms is independent of the market clearing mechanism. That is, in either case, a decrease in loan supply will lead to less bank borrowing by small firms relative to any non-bank borrowing. This leads to the following hypothesis:

Hypothesis 2 *The proportion of loans held by banks will increase (decrease) for bank-dependent firms following the emergence of the CD market in 1961 (1966 Credit Crunch).*

The predicted effect on the debt placement structures of large firms, however, will depend on the nature of loan market clearing. As discussed above, if markets clear by price, large firms are expected to substitute between bank and non-bank debt. Given their greater access to public markets, one would expect this substitution to be more pronounced than that of small, bank-dependent firms. On the other hand, if markets clear through quantity rationing, the price and availability of bank loans for the largest, least risky firms will be relatively unaffected by loan supply movements. Therefore, their debt source mix should be less sensitive to loan supply movements than that of smaller, riskier firms. These predictions for the relative movements in debt source mix for small and large firms are summarized in the following hypotheses:

Hypothesis 3 *If bank loan markets clear by price:*

a) The proportion of loans held by banks will increase (decrease) for firms with access to public debt markets following the emergence of the CD market in 1961 (1966 Credit Crunch), relative to bank-dependent firms.

b) The proportion of public debt will decrease (increase) for firms with access to public debt markets following the emergence of the CD market in 1961 (1966 Credit Crunch), relative to bank-dependent firms.

Hypothesis 4 *If bank loan markets clear through credit rationing:*

a) The proportion of loans held by banks will increase (decrease) for bank-dependent firms following the emergence of the CD market in 1961 (1966 Credit Crunch), relative to firms with access to public debt markets.

b) The proportion of public debt will be unaffected for firms with access to public debt markets following the emergence of the CD market in 1961 (1966 Credit Crunch).

3.2 Empirical Strategy

The empirical strategy is designed to evaluate the capital structure effects of loan supply changes while minimizing concerns about endogenous demand effects. This is accomplished in several ways. First, in the spirit of Kashyap, Stein, and Wilcox (1993), I focus on ratios of debt to equity, bank debt to non-bank debt or public to private debt in a firm's capital structure. While a firm's demand for external finance is likely to largely reflect changes in aggregate economic growth, it is less clear that the mix of capital sources would be so affected. Second, the two events on which I focus represent opposite movements in loan availability, but occur in similar periods of aggregate demand. That is, for both events, economic growth is robust in the pre-event period, followed by a brief slowdown at the time of the event, and a recovery in the post-event period. Therefore, any demand-driven capital structure changes would tend to go in the same direction for the two events, while supply effects should move in opposite directions. Comparing the capital structure movements across these two events will then help to identify the supply effects.

Third, where possible, I employ a sample of large firms with public market access as a control group, in order to net out any demand effects that are common to both groups. For example, to evaluate hypothesis 1, I use the difference in differences specification discussed by Meyer (1995):

$$Leverage_{it}^{j} = \alpha + \alpha_1 d_t + \alpha_2 d^j + \alpha_3 d_t d^j + X_{it}^{j'}\beta + Z_t'\gamma + \epsilon_{it}^{j}, \tag{1}$$

where d_t is an indicator variable equal to one in the post-event period, d^j is an indicator variable equal to one for the experimental group (here small firms), X_{it}^{j} and Z_t are vectors of firm specific and time period specific control variables.[8] In this specification, α_3 measures the difference in the mean of the dependent variable due to the event for the small firms, relative to the large firms. Any remaining loan demand effects would have to be ones that affected one group, but not the other.

[8]Since a maintained assumption of equation (1) is that there is no pre-event trend in the dependent variable, I first remove the pre-event time trend for each firm group from the entire time series.

Finally, as in Faulkender and Petersen (2005), I control for demand factors by including in X_{it}^j firm characteristics designed to proxy for firms' demands for different capital structures. Similarly, I include several proxies for macroeconomic conditions in Z_t to control for any remaining effects they may have on capital structure demands (Korajczyk and Levy (2003)).

Following Gertler and Gilchrist (1994) and Oliner and Rudebusch (1995) I use firm size to proxy for access to public debt markets in the tests below. While this may not be a perfect proxy, size is clearly highly correlated with public debt market access. Faulkender and Petersen (2005) show a significant difference in several measures of firm size between Compustat firms with a credit rating and those without. Firm size is also highly significant in their instrumental variables regression of the determinants of public market access. Several papers in the literature on investment-cash flow sensitivity have shown that small firms are more likely to be liquidity constrained than larger firms (see, for example Fazzari, Hubbard and Peterson (1988)). Finally, several studies of the determinants of firm lender choice (e.g. Johnson (1997), Krishnaswami et al. (1999)), show that the proportion of outstanding debt from public sources is strongly correlated with firm size.

3.3 Data Description

The data used for these natural experiments come from three sources: the *Quarterly Financial Report for Manufacturing Corporations* (hereafter *QFR*) published (until 1982) by the Federal Trade Commission; *Moody's Industrial Manuals*; and the annual *Compustat* database.

The *Compustat* data includes two sample sets covering the periods 1958-1964 and 1963-1968. Two samples are drawn for each period, one including only manufacturing firms (SIC 2000-3999), for consistency with the *QFR* data, and one including all industries, except utilities (SIC 4900-4949) and financial firms (SIC 6000-6999). The samples include only firms with at least two years of data in both the pre-event and post-event periods, and exclude firm-years influenced by major mergers or acquisitions.

The *QFR* reports detailed aggregate financial statements for the manufacturing sector as a whole and for nine different size classes based on the total book value of assets. Statistics are compiled from a random sample based on confidential company filings. The advantage of this data source over firm level sources such as *Compustat* is that outstanding debt is reported separately based on whether it is owed to a bank or non-bank lender. It also provides quarterly data for earlier time periods than are available in *Compustat*, which begins quarterly coverage for balance sheet variables in 1976. The disadvantage is that it is not available at the firm level, so the results using this data source rely to some extent on the assumption that manufacturing firms within a given size class are fairly homogenous.

Faulkender and Petersen (2005) document that only the largest 19 percent of firms in Compustat have a public debt rating. Therefore, when using the Compustat data, I define the large (small) firm groups based on the upper (lower) two book asset deciles in the Compustat universe each year.[9] When using the *QFR* data, I define the large firm group as firms with assets greater than $100 million, while the small firm group includes firms with assets between $1 million and $10 million. These size ranges are broadly consistent both with those used by previous researchers employing this data source (e.g. Gertler and Gilchrist (1993) and Oliner and Rudebusch (1995)) as well as with the Compustat decile definitions.[10]

In addition, in order to look specifically at substitution towards public debt and to extend the placement structure analysis to the firm level, I hand collect data for a sample of firms from Moody's Industrial manuals. Specifically, I collect data for a random sample of 100 manufacturing firms, fifty each from the top and bottom book asset value deciles of firms in both Moody's and CRSP or Compustat. From the long term debt schedule, I gather annual information on the dollar value of public and private debt outstanding (including current portion) for each firm-year from 1964 through 1968. I then merge this

[9]Since a large number of smaller firms were added to the Compustat database in 1960, for the years 1958 and 1959, I define the small firm group based on the 1960 Compustat universe and back-fill their firm characteristics using Moody's Industrial Manuals.

[10]Results are robust to moderate changes in these cutoffs.

data with other firm characteristics from either Compustat or Moody's.

Table 1 displays summary statistics for the small and large firm groups' capital structures over the period 1960 through 1968, which covers both events under study, using the *QFR* and *Moody's* data. The table shows that, while the leverage ratios for these groups are of similar magnitude, the composition of debt outstanding differs substantially. First, consistent with earlier studies (e.g. Gertler and Gilchrist (1994) and Brav (2005)), small firms rely more heavily than large firms on short-term financing, the majority of which is likely due to banks. Second, among long-term financing, the small firms rely more heavily on banks as lenders than do large firms . As a result, the percentage of long-term debt due to banks for small firms is more than double that of the large firms. However, it also interesting that even for small firms, bank debt makes up typically less than a third of long term debt. Thus, while these firms may not have access to public debt markets, and are clearly more bank-dependent than the large firms, a significant portion of their financing comes from (presumably private) non-bank lenders. Finally, as expected, large firms obtain a substantially higher percentage of their debt from public debt markets than do small firms.

4 Results

4.1 Leverage ratios

Figure 1 shows, in event time, the difference in average total leverage between the small and large firm groups, relative to that difference at the start of each loan supply movement (year-end 1960 for the emergence of the CD market and year-end 1965 for the 1966 Credit Crunch). The series are calculated using annual *Compustat* data. Panel A shows results for total leverage ratios that are consistent with the prediction in Hypothesis 1. That is, following the introduction of the negotiable CD market, leverage ratios for small firms rose relative to those of large firms, and vice versa following the 1966 Credit Crunch. Panel C shows that the same pattern holds for the ratio of long-term debt to assets, suggesting that the leverage changes are not being driven solely by changes in short-term borrowings. For both events, these changes to the cross-section of leverage appear to

be persistent. While this is not surprising in the case of the CD market emergence, since this can be viewed as a permanent supply shift, it is more surprising with respect to the 1966 Credit Crunch, since credit conditions had eased by the beginning of 1967, as indicated by the dashed vertical line in Panel B. However, as I will discuss later in this section, much of this leverage effect resulted from increased public debt issuance by large firms. The timing and persistence of these leverage changes are consistent with the institutional delay involved with floating public bonds as well as the transaction costs (or impossibility) of early retirement.

To test Hypothesis 1 more formally, I estimate equation (1) with respect to each event using the annual *Compustat* data. As discussed in the previous section, I include proxies for firm characteristics and macroeconomic conditions in order to control for firms' demands for different capital structures. The firm level control variables chosen are those that Rajan and Zingales (1995) identify as those most robustly associated to leverage ratios in previous capital structure studies.[11] These include profitability, defined as operating income scaled by book assets, which can proxy either for taxable income to be shielded or internal cash available for investment funding; asset tangibility, measured as net property, plant and equipment as a fraction of total assets, which proxies for bankruptcy recovery rates; the ratio of the market value to the book value of assets, which proxies for growth opportunities, and thus the severity of potential agency costs; and firm size, measured by the log of book assets, which proxies for expected bankruptcy costs and information asymmetry between the firm and investors.

The macroeconomic control variables are intended to control for time-period effects, other than the event being studied, that may influence capital structure. These include growth in GDP over the previous year, following Kashyap et al.(1993) and Gertler and Gilchrist (1994), and inflation expectations, measured using the Livingston Survey, as in Frank and Goyal (2004).

[11] These also correspond closely to the "Tier 1" factors identified by Frank and Goyal (2004), with the exception of industry leverage and an indicator for positive dividend payments. Results are robust to inclusion of these additional factors.

The estimation results are presented in Table 2. Panel A presents results for the CD market emergence, and panel B for the 1966 Credit Crunch. The first column in each table, which excludes the group and time indicators, shows that the signs and significance of the firm level control variables are consistent with previous capital structure studies. The second column replaces the size variable with an indicator equal to one for firms in the small, bank-dependent group. The estimated coefficients suggest that small firms had, on average, higher leverage ratios than large firms over this period, as reflected in Table 1. While this appears inconsistent with the results in Faulkender and Petersen (2005), once time period effects are controlled for, the sign becomes negative. Column (3) shows that, when including the post-event indicator by itself, there does not appear to be a significant leverage effect associated with either event for the sample as a whole.

However, my primary interest is in the coefficients on the group indicator interacted with the post-event indicator(s), obtained from the full specification of equation (1). These coefficient estimates are presented with and without the firm and macroeconomic control variables, respectively, in columns (4) and (5) for the manufacturing firm sample, and columns (6) and (7) for the all-industries sample. The results indicate strong support for Hypothesis 1. For example, in the manufacturing firm sample, after controlling for demand factors (column (5)), leverage ratios increased by 2.6 percentage points for small firms relative to large firms following the emergence of the negotiable CD market. Conversely, during the 1966 credit crunch, relative leverage ratios fell by 1.9 percentage points and continued to fall in the post-crunch period, for a total relative drop of five percentage points. This effect holds both in the manufacturing firm and the all-industries sample, and is statistically significant in all specifications. Relative to an average leverage ratio of approximately 20% for the sample period, these magnitudes are also economically meaningful, representing a 10 to 20 percent change in leverage.

4.2 Debt-Equity Choice

In order to attribute the leverage changes documented above to supply-side effects on financial policy, they should be associated with consistent changes in debt and equity

issuance activity. To examine this, first I present in Figure 2, for each year surrounding the two events, the average net debt issuance for the small firm group minus the average for the large firms. Total debt issuance is shown in Panels A and B and long term debt issuance in panels C and D. Consistent with small firms being constrained in their access to debt capital during times of tight credit supply, we see a relative increase in debt issuance following the emergence of the CD market and a sharp decline during and just after the 1966 credit crunch. While there appears to be a pickup in small firm debt issuance activity in 1960, just before the CD market emerged, I show in the next section that there was a sharp shift in the source of this debt that is consistent with the easing of a constraint on bank loan availability.

To more formally estimate the effect on issuance choice, I estimate a discrete choice model of similar form to equation (1), where the dependent variable equals one if, conditional on a firm issuing debt or equity, it chooses equity, and zero if it chooses debt. Following Hovakimian,Opler and Titman (2000), Korajczyk and Levy (2003) and Leary and Roberts (2005), I define a debt issuance as a net increase in total (short term plus long term) debt outstanding greater than one percent of beginning-of-year book assets. Following Fama and French (2005), an equity issuance is defined as the product of (1) the split-adjusted growth in shares and (2) the average of the split adjusted stock price at the beginning and end of the fiscal year, in excess of one percent of book assets. Dual issuances (debt and equity in the same year) are excluded.

Firm control variables include all those used in Table 2, measured at the beginning of the fiscal year, plus the firm-specific stock return and the level of leverage. The results, shown in Table 3, suggest that bank-dependent firms are relatively more likely to issue equity and less likely to issue debt in periods of tight credit supply. That is, the negative coefficient on the interaction of the bank-dependent indicator with the post-CD market indicator shows that, relative to large firms, small firms were more likely to issue equity rather than debt before the emergence of the CD market. Similarly, the positive coefficients on the interaction of the bank-dependent indicator with the indicators for the credit crunch and post-crunch period suggest these small firms were

relatively more likely to issue equity when the supply of bank loans decreased, although this effect is only statistically significant in the post-crunch period. Such a delay is not surprising, since, given the institutional arrangements required to issue external equity, any change in financial policy would not be immediately reflected. While there are certainly other motivations for financing choices, as reflected by the significant coefficient estimates on the proxies for the market-to-book ratio, stock return and leverage ratio, these results suggest that, at the margin, issuance choices are influenced by prevailing credit conditions.

4.3 Debt Placement Structure

4.3.1 Bank vs. Non-bank Debt

Further evidence that the leverage effects documented above result from shifts in bank loan supply can be obtained by examining the associated changes in the mix of debt outstanding from bank and non-bank sources. In addition, such an analysis is important in determining whether supply factors are relevant to the growing literature that studies the determinants of firms' debt placement structures.[12]

Summary statistics for the movements of bank and non-bank debt, based on data from the *QFR* are shown in Figure 3. Each chart shows changes in the ratio for each group of firms (small and large) relative to the beginning of the event period. The first column depicts data from the emergence of the negotiable CD market and the second column depicts data from the period surrounding the 1966 credit crunch. Panels A and B chart movements in the ratio of bank debt to assets that are consistent with the role of supply factors. That is, after supply constraints were eased by the emergence of the negotiable CD market, we see a pronounced increase in the use of bank debt by small firms relative to large firms. Similarly, during, and for the first year after, the 1966 Credit Crunch, we see a relative drop in the bank debt to asset ratio of the small firm group. Panels C and D show that before the emergence of the CD market, small firms filled any

[12]See, e.g., Johnson (1997), Krishnaswami et al. (1999), Cantillo and Wright (1998), and Denis and Mihov (2002)

demand for additional debt through non-bank sources, while following the 1966 credit crunch, it was the large firms who turned increasingly to non-bank debt.

These movements are summarized in Panels E and F, which show the ratio of long-term bank debt to total long-term debt for each group. Here again we see that, consistent with the supply movements, the relative ratios move in opposite directions following the two events. Also, the CD market emergence, which represented a permanent supply shift, is associated with a persistent relative change in the bank debt mix, while the temporary credit crunch led to a temporary relative change. Even in the latter case, however, the difference persisted for at least a year after the crunch was officially over.

In Table 4, I explore the validity of hypothesis 2, namely that the use of bank debt, relative to non-bank debt, by small, bank-dependent firms increases (decreases) as supply frictions in the banking system loosen (tighten). To the extent that bank supply shocks impact the capital structures of these firms, it should be most evident in their use of bank debt. To test this hypothesis, I use the following straightforward regression specification:

$$BankPct_{it} = \alpha + \alpha_1 d_t + X_{it}^{j'}\beta + Z_t'\gamma + \epsilon_{it}^{j}. \tag{2}$$

where $BankPct_{it}^{j}$ is the percentage of debt due to banks, d_t is an indicator variable equal to one in the post-event period, and X_{it}^{j} and Z_t are vectors of firm-specific and macroeconomic control variables. In this specification, α_1 measures the difference in the mean of the dependent variable attributable to the event. Hypothesis 2 then requires α_1 to be positive for the emergence of the negotiable CD market and negative for the 1966 Credit Crunch.

The firm-specific control variables are chosen for consistency with previous studies of the placement structure of debt, such as Johnson (1997) and Cantillo and Wright (2000). These studies view the choice of lender as a function of the tradeoff between the adverse selection and agency costs of arms-length debt and the compensation required by banks for their monitoring and renegotiating services. Firm size, measured as the book value of

assets, proxies for the degree of information asymmetry between the firm and investors.[13] The ratio of the market value of assets to the book value of assets proxies for a firm's growth opportunities, which measures the severity of potential agency conflicts. Leverage, measured as the ratio of total debt to assets, proxies for the amount of equity-at-risk that influences managers' incentives, as in Hoshi, Kashyap, and Scharfstein (1993).[14] Earnings volatility, measured as the standard deviation of operating earnings scaled by book assets over the trailing 12 quarters, proxies for the riskiness of a firm's assets and resulting need for monitoring.

I estimate equation (2), using data from the QFR, since this breaks long-term debt outstanding into bank and non-bank components. Since this data is given at the size-stratification level, rather than firm-level, in order to estimate equation (2), I treat each size stratification as an individual firm. The two smallest strata (excluding firms with assets less than $1 million) are included in the bank-dependent group. In the analysis below I also include firms with public market access, which will consist of the three largest strata. The equation is then estimated using six years of quarterly data for each strata.

Results of the estimation of equation (2) are shown in Table 4. As can be seen, the evidence supports the hypothesis. That is, following the introduction of the negotiable CD market, the fraction of debt held by banks increased by 3.1 percentage points for these bank-dependent firms, controlling for demand factors and macroeconomic conditions. By contrast, the fraction decreased by 3.4 percentage points during the 1966 credit crunch, and this effect persisted into the post-crunch period, but loses statistical significance. The magnitudes of these changes are significant as well, representing a more than 10% change in the portion of debt due to banks for these firms. These results suggest that the bank borrowing of these small firms is constrained by frictions in the flow of capital

[13]Given the high correlation between firm size and my proxy for bank dependency and public market access, I exclude firm size from the regressions when the firm group indicator is included. However, results in this and the following sections are robust to the inclusion of the firm size proxy.

[14]Given the correlation between leverage and the other included independent variables, I follow Johnson (1997) in first regressing leverage on the other included variables and using the residuals from that regression as an instrument for leverage.

through the banking system and that supply shocks result in significant time variation in their debt placement structure.

As discussed in section 3, the predicted *relative* changes in debt source mix between bank-dependent and public access firms will depend on the nature of the loan market clearing mechanism. If markets clear by price, we would expect the bank-nonbank mix of large firms to be more sensitive to supply movements than that of small firms. If markets clear through quantity rationing, however, the opposite should hold. To investigate hypotheses 3(a) and 4(a), I use a version of equation (1) in which the dependent variable is long-term bank debt as a percent of total long-term debt and the control variables are the same as in Table 4. Given this specification, hypotheses 3(a) requires a significant negative (positive) coefficient on the interaction between the bank-dependent indicator and the post-event indicator. for the emergence of the negotiable CD market (1966 Credit Crunch). Hypotheses 4(a) requires the opposite.

The estimation results are shown in Table 5, which is analogous to Table 2. Panel A presents results for the negotiable CD innovation and panel B shows results for the 1966 Credit Crunch.

The first column in each panel shows the coefficient estimates including only the firm-level controls for comparison with previous studies. Results are generally consistent with those in Johnson (1997), who provides the most closely related specification. The second column includes the firm group indicator and shows that, consistent with the definition, bank-dependent firms borrow a significantly higher percentage of their debt from banks, even after controlling for other determinants of debt mix demand. While the third column indicates that neither event had a significant impact on the average bank debt percent for the sample as a whole, columns (4) and (5) show strong support for hypothesis 3(a). The coefficients on the bank-dependent indicator interacted with the post-event indicator are significantly positive following the emergence of the CD market and significantly negative both during and after the 1966 Credit Crunch, and these results are robust to inclusion of both firm level and macroeconomic controls. Thus, even after controlling for firms' demand for different debt sources and other economic conditions

that may influence placement structure (see Cantillo and Wright (2000)), the proportion of debt due to banks increases (decreases) for bank-dependent firms *relative* to firms with public market access, following expansions (contractions) of bank loan supply. The impact is also of an economically significant magnitude. The difference-in-difference estimates range from three to four percentage points, relative to an average long-term bank percent of 24% to 33% for the bank-dependent firms. These results are consistent with those in Table 4, and also indicate that the bank borrowing of large firms is less affected by loan supply shocks than that of small firms. Given the greater ability of large firms to substitute among debt sources, this suggests that banks respond to supply constraints at least in part through quantity rationing.

4.3.2 Public vs. Private Debt

In addition to choosing between bank and non-bank debt, firms also choose between public and private debt sources. This distinction is of interest because while bank-dependent firms, as defined in the previous section, may have access to private non-bank sources of debt, their access to public debt markets is likely to be limited. Therefore, as discussed in Section 3, if banks respond to a tightening supply of loanable funds by raising loan rates, one would expect firms with access to public markets to substitute towards public debt to a significantly greater degree than bank-dependent firms. Given the lack of evidence of a decrease in non-bank debt usage by large firms following the emergence of the bank CD (see Figure 4), I limit my focus in this section to the 1966 Credit Crunch event. Also, for ease of exposition, I redefine the experimental group to consist of the large firms with public market access and the control group to consist of the small, bank-dependent firms.

In order to investigate the choice between public and private debt, in this section I use the data collected from Moody's manuals described earlier. Table 6 and Figure 4 report summary statistics. Consistent with the results in the previous section, we see a substantial drop in private debt issuance by small firms during and for the first year after the credit crunch, while large firms continued to be able to issue private debt throughout

the period. Nonetheless, we see a sharp increase in the use of public debt by these large firms following the credit crunch. While public debt accounted for only seven percent of the net debt issuance in the two years leading up to the credit crunch, it accounted for roughly fifty percent in the two years after. Comments from the business press clearly attribute this increased use of public debt to the limited availability of bank loans during the credit crunch. For example, the *Investment Dealer's Digest*, in their ten-year review of corporate financing activity published in 1970, stated:

> "Why this almost 30% increase in public financing during 1966? The big suppliers of funds - banks and institutions - found themselves in the throes of a tight money situation and were forced to ration available monies."

To test hypotheses 3b and 4b, I estimate a version of equation (1) with public debt as a percent of total long-term debt as the dependent variable. The results, base on the annual Moody's sample from 1964 through 1968, are shown in Table 7. The positive and highly significant coefficient on the public access indicator in column (2) lends support for the use of size groupings as a proxy for public debt market access. The coefficients on the post-event indicators in column (3) show that the sample as a whole had a higher public debt percentage during and following the credit crunch, but not significantly so. However, in support of hypothesis 3b, the coefficients on the interaction terms in columns (4) and (5) show that, even after controlling for demand factors and economic conditions, firms with access to public debt markets increased their fraction of debt from this source, relative to bank-dependent firms, following the credit crunch. While the coefficient is positive both during the "Crunch" period and the "Post-Crunch" period, it is only statistically significant in the latter period. The difference-in-difference of four percentage points in the "Post-Crunch" period is also economically significant relative to the average public debt percent of 28.5 percent in 1966.

While the evidence in the previous section suggested that banks respond to supply frictions by rationing loans for small borrowers, the increased use of public debt following the credit crunch suggests that a price mechanism may also be at work. Thus, while

earlier evidence suggested small firms appear to turn more heavily to equity financing in periods of decreased loan supply, large firms appear instead to turn to public debt markets.

5 Implications for Previous Studies

5.1 Capital structure and public market access

The results presented above suggest that frictions that limit the flow of capital through the banking system affect the capital structures of firms differentially according to their access to alternate debt sources. This differs from the assumption in Faulkender and Petersen (2005) (hereafter FP) that these capital structure differences arise because banks offer a costly and/or incomplete solution to the informational asymmetries that lead to debt market segmentation. However, these explanations are not mutually exclusive and indeed may be complementary. That is, if firms without access to public markets are constrained in the amount of debt they are able to borrow from private lenders, the degree to which these constraints bind is likely to vary with changes in banks' access to capital.

The primary regression in FP is of the form:

$$Lev_{it} = \alpha + \gamma * PubAccess_{it} + X'_{it}\beta + \epsilon_{it}. \tag{3}$$

where $PubAccess_{it}$ is a proxy for a firm's access to the public debt markets and X_{it} is a vector of firm characteristics designed to capture variation in firm demand for debt. In order to test for the complementarity of the effects of credit conditions, I modify the regression specification in (3) to include interaction terms between public debt market access and various proxies for changes in bank loan supply. This has the effect of parameterizing the coefficient on debt market access in the following manner:

$$Lev_{it} = \alpha + PubAccess_{it} * (\gamma_0 + \gamma_1 * BankSupply_t) + X'_{it}\beta + Z'_t\eta + \epsilon_{it}. \tag{4}$$

where $BankSupply_t$ is a proxy for aggregate tightness of bank loan supply and Z_t is a vector of additional controls for overall macroeconomic activity.

The first bank loan supply proxy I use is an indicator variable that equals one in periods when Regulation Q interest rate ceilings were binding. As discussed above, these ceilings limited banks' ability to compete for investor deposits when market rates rose above them.[15] For the second proxy, I employ a direct measure of the willingness of banks to extend loans, taken from the Federal Reserve Board's *Senior Loan Officer Opinion Survey on Bank Lending Practices*. The Fed surveys most large commercial banks quarterly and asks how they have changed their "standards of creditworthiness for loans to non-financial businesses" and "willingness to make term loans to businesses."[16] According to Schreft and Owens (1991), the survey's design is based on the rationale that "banks first respond to changes in the cost and availability of loanable funds by changing non-price lending terms and conditions of lending," suggesting this is a plausible proxy for loan supply. Lown and Morgan (2004) present evidence that changes in these lending standards are strongly correlated with bank loan changes and real output and are more important than interest rates in explaining them. They also show (weak) evidence that the survey standards capture changes in loan supply after controlling for demand.

The third proxy is a measure of the stance of monetary policy, for which I use the spread between the federal funds rate and the rate on 10-year constant maturity Treasury bonds[17] , as suggested by Bernanke and Blinder (1992). Proponents of the bank lending channel of monetary policy have argued that policy shocks influence economic activity by reducing the supply of bank loans due to the drain on bank reserves. Opponents have countered that this effect is less important when banks have ready access to capital sources that are not subject to reserve requirements. Nevertheless, to the extent that

[15]Note that since Regultion Q was phased out beginning in 1980, this indicator variable is equal to zero for all years after 1979.

[16]The nature of these questions and sample size have changed slightly since the survey was begun in 1967. The survey was also suspended from 1984:Q1 until 1990:Q2, leading to a gap in the data when using this proxy.

[17]Both interest rate series are obtained from the Federal Reserve Board's website

these sources are imperfect substitutes for reservable funds, there may still be an impact to loan supply.[18]

The sample used to estimate equation (4) is taken from Compustat from 1965 through 2000. Since debt ratings are not available on Compustat before 1985, and for consistency with the previous section, I define firms in the upper 30% of the distribution of book assets in each year as those with public market access and those in the bottom 30% as those without. For robustness, I also follow the methodology of FP in constructing a proxy for debt market access. That is, I first estimate a probit model of the existence of a debt rating on various firm characteristics over the period 1986-2000 (the years in which the debt rating variable is available on Compustat). I then apply the estimated coefficients both in and out of sample to generate a predicted probability of public market access for each firm-year from 1965-2000 and use this estimated probability as a measure of debt market access. Since results are unaffected by the choice of proxy, I report results based only the book assets groups. The choice of firm level control variables in (4) follows the specification in FP, and the controls for economic conditions are the same as those used in section 4.

The results are shown in Table 8. As in FP, the proxy for public debt market access is positive and statistically significant, and of similar magnitude as the results reported in FP. In addition, however, the coefficients on the interaction terms of the access proxy and all three loan supply measures are positive and statistically significant as well. This suggests that the magnitude of the leverage difference between firms with and without public debt market access is greater in periods of tight credit conditions/reduced loan supply and dampened in periods of looser credit. For example, a one standard deviation increase in the tightness of credit condition as measured by the Senior Loan Officer survey increases the leverage spread between firms with and without public market access increases by about 2.1 percentage points relative to an average difference over the sample period of 7.6 percentage points. This lends further support to the role of bank loan supply as a determinant of corporate capital structure and suggests some important time

[18]See Stein (1998) and the discussion in Kashyap and Stein (2000).

variation in this effect.

5.2 Interest rates and placement structure

Diamond (1991), in his model of the choice between public and private debt, predicts that the ratio of bank to non-bank debt should be positively related to interest rates. This is due to a fall in the present value of future profits, which increases the value of monitoring for the firm, essentially a demand-side argument. Cantillo and Wright (2000) provide some empirical support for this prediction. As Stein (1998) discusses, though, when interest rate movements are associated with changes in the availability of bank loans (i.e. credit crunches or monetary shocks), one would expect the opposite. The data from the time period studied in this paper shows evidence consistent both predictions.

Figure 5 plots the real interest rate along with the bank debt percent for small firms (those for which monitoring is more important and whose access to bank debt is more adversely affected by credit crunches), relative to large firms, for the period from the fourth quarter of 1959 through the end of 1971. The vertical solid (dashed) lines mark the beginning (end) of the 1966 credit crunch and a similar episode that occurred in 1969. This latter episode was also associated with Regulation Q interest rates becoming binding and, as discussed by Owens and Schreft (1993), a significant amount of non-price credit rationing.

Over the sample period as a whole, the ratio of bank to non-bank debt appears to move positively with interest rates (correlation coefficient of 0.38), in support of Diamond's prediction. However, the figure also reveals that during the two crunch episodes, a rise in the real interest rate is accompanied by a relative decline in the bank debt use by the smaller firms, followed by a reversal after credit conditions eased. In fact, the correlation coefficient changes sign during the 1966 and 1969 credit crunches, to -0.675 and -0.680, respectively. Thus, when rising interest rates are associated with reductions in bank loan supply, the small firm group behaves as predicted by Stein (1998).

The time period considered here is arguably not long enough to make definitive statements about the relation between interest rates and debt source choice. However, the

evidence suggests that in order to fully understand and properly test this relationship, we need to consider both the macroeconomic environment as well as the differential effects on bank dependent and non-dependent firms. A full investigation of these issues is left to future work.

5.3 Debt issuance timing

Several previous papers have examined the extent to which firms time debt issuances to periods of low debt capital costs. While there is little agreement on managers' ability to forecast future interest rate movements or bond returns,[19] recent survey evidence in Graham and Harvey (2001) and empirical evidence in Barry et al (2005) suggest that firms tend to issue debt when interest rates are low relative to recent history.

However, such behavior seems inconsistent with that described in Section 5 of firms issuing public debt for precautionary reasons following a period of tight credit supply. In fact the opposite relation is predicted by the sentiment expressed in the *Investment Dealer's Digest* in 1970 that "the availability factor" led firms to pursue debt financing despite historically high interest rates.

> "Most of this increase in [public] debt [in 1967] can be accounted for by the liquidity crisis of the previous year as well as anticipation of another tight money situation in the year ahead. The availability factor was obviously the major reason why so many companies went ahead with debt financing during 1967, despite a market place which commanded the highest interest costs since the post Civil War period."

To explore this empirically, Table 9 reports the distribution of debt issuances across historical interest rate deciles, as in Barry et al (2005). That is, each month, the current interest rate is ranked relative to the rates over the previous 10 years and sorted into

[19] See Baker, Greenwood and Wurgler (2003), Butler, Grullon and Weston (2004) and Baker, Taliaferro and Wurgler (2004)

deciles. The table then shows the average number of debt issuances per month across the deciles.

The first column reproduces the results found in Table 6 in Barry et al (2005). Their evidence, over the sample period from 1970-2001, shows evidence consistent with "backward-oriented" debt market timing. That is, debt issuance increases monotonically as the interest rate declines relative to rates over the previous ten years. The next column shows the same calculation over the period from 1960 to 1969, which includes the two credit crunch periods discussed previously. Consistent with the substitution from bank to public debt, we see that the previous pattern is not present and, if anything, reverses over this period. This result does not dispute that managers use a historical interest rate rule of thumb in issuing debt at other times. But it does suggest that there are other factors that influence the timing of a firm's debt issuance, particularly during periods of limited bank loan supply.

6 Conclusion

This paper studies the impact of shifts in the availability of bank loans on the capital structures of bank-dependent firms relative to firms with access to public debt markets. The results suggest that frictions in the flow of capital through the banking system are an important determinant of both time series and cross-sectional variation in debt placement structures and leverage ratios. Using two natural experiments, I show that following expansions (contractions) in the availability of bank loans, leverage ratios of bank-dependent firms significantly increase (decrease) relative to firms with public market access. Consistent with the role of supply factors, these leverage changes are associated with constrained access to bank debt and a greater reliance on equity financing by small firms in periods of tight credit, as well as substitution from private to public debt by large firms.

These findings offer an alternative, but complementary, explanation for the relationship between debt market segmentation and capital structure documented by Faulkender and Petersen (2005). In fact, the evidence presented here suggests that the magnitude of

the effect they document is positively associated with the tightness of credit conditions.

My findings also point to several possible avenues for future research. First, my results suggest that firms with access to public equity markets use this channel to partially mitigate the impact of limited bank loan availability. It would be interesting to study the extent to which equity market access helps firms avoid the capital constraints associated with credit shocks such as monetary tightenings. Second, while the persistent leverage effect of the 1966 Credit Crunch is consistent with the role of transaction costs and institutional frictions, there may be additional explanations. For example, Graham and Narasimhan (2004) show evidence that the Great Depression had a lasting impact on managers' attitudes towards debt financing. The impact of other economic shocks, such as credit crunches, on managerial attitudes and expectations that influence financial policy is unexplored. Finally, the results with respect to the emergence of the negotiable CD market suggest an important link between financial innovation and firm financing, as discussed in Titman (2002). The impact of other such innovations on capital structure may be a fruitful area of investigation.

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Figure 1

Relative Leverage Changes Surrounding Bank Loan Supply Shifts

Data are from the annual *Compustat* database. The sample includes all manufacturing firms (sic codes between 2000 and 3999), excluding firms involved in major mergers or acquisitions. Panel A shows, in event time, the difference in average total leverage between the small and large firm groups, relative to that difference at the start of each loan supply movement (year-end 1960 for the emergence of the CD market and year-end 1965 for the 1966 Credit Crunch). Total leverage is defined as the sum of short-term and long-term debt divided by the book value of assets. Panel B presents the same calculation for the ratio of long-term debt to book assets. Small (big) firms are defined as firms in the two lowest (highest) book asset deciles in each year.

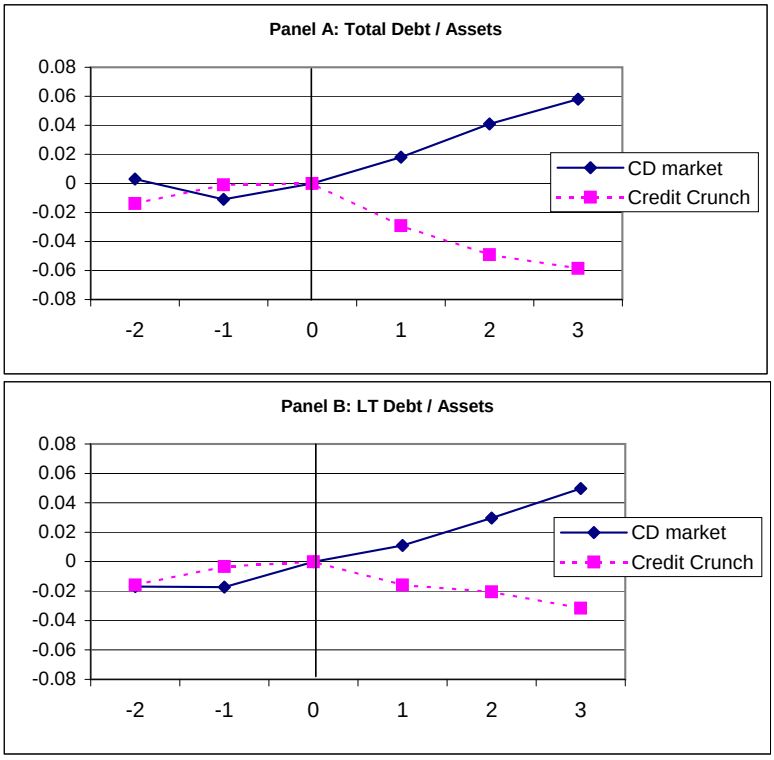

Figure 2

Net Debt Issuance

Data are from the annual *Compustat* database. The sample includes all manufacturing firms (sic codes between 2000 and 3999), excluding firms involved in major mergers or acquisitions. Panels A and B (C and D) present, for each year, the average net change in total (long-term) debt outstanding, scaled by book assets at the beginning of the year, for the small firm group minus the average for the large firm group. Small (large) firms are defined as firms in the two lowest (highest) book asset deciles at the beginning of each year.

Figure 3

Bank and Non-Bank Debt

Data are from the *Quarterly Report for Manufacturing*. Small firms include those with book value of assets between $1 million and $10 million; large firms include those with book value of assets greater than $100 million. All series are shown as absolute changes in the relevant ratio relative to 1960Q1 (Panels A, C and E) or 1965Q4 (Panels B, D and F).

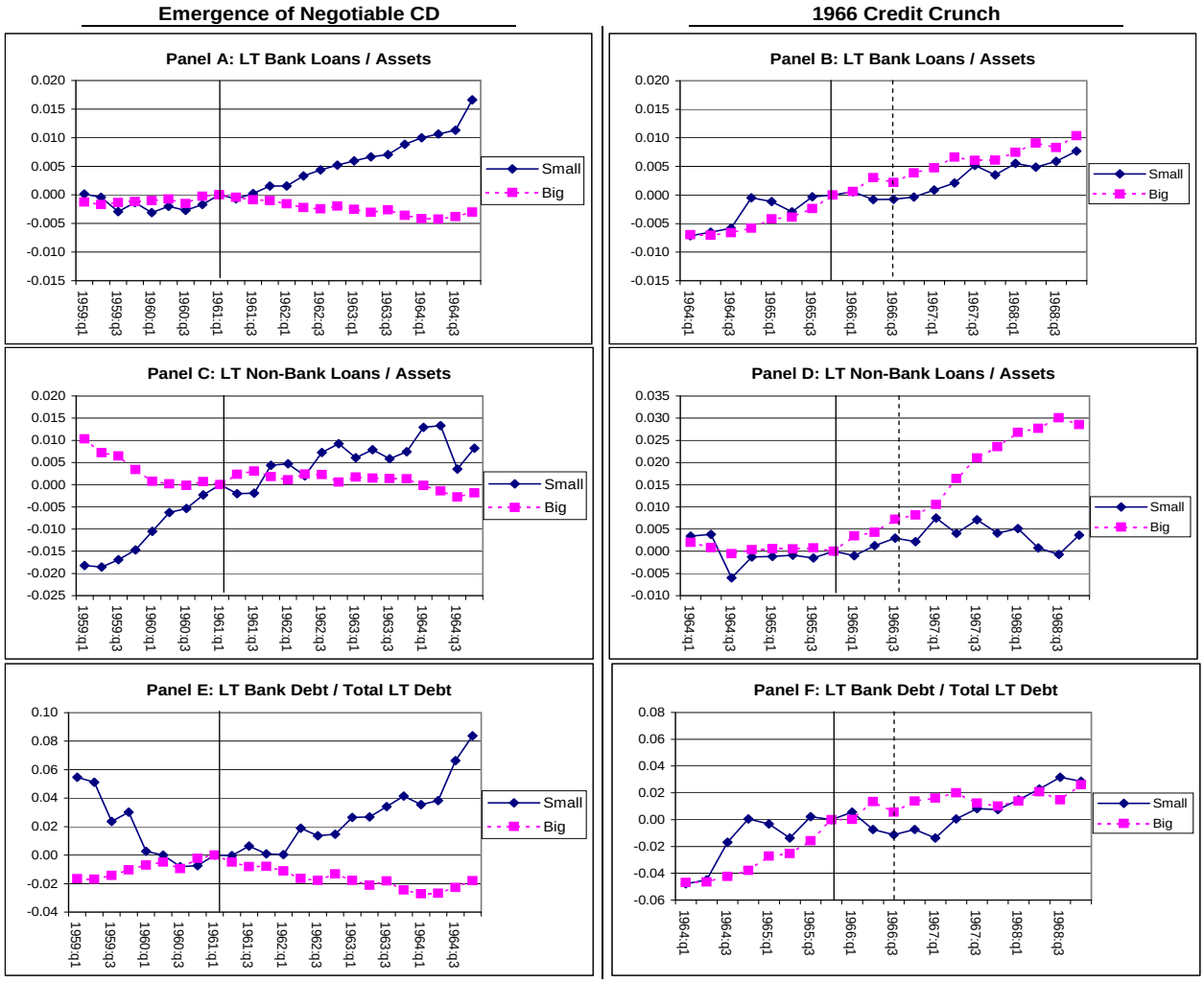

Figure 4

Public and Private Financing Surrounding the 1966 Credit Crunch

Data are from *Moody's Industrial Manual* from 1964 through 1969. The small (large) firms group consists of a random sample of 50 firms from the lowest (highest) book asset decile of manufacturing firms in both Moody's and Compustat. Panels A and B are presented in levels; Panel C is presented in absolute changes relative to 1966. In panel D (E), an issuance is defined as a net increase in private (public) debt outstanding of at least one percent of assets.

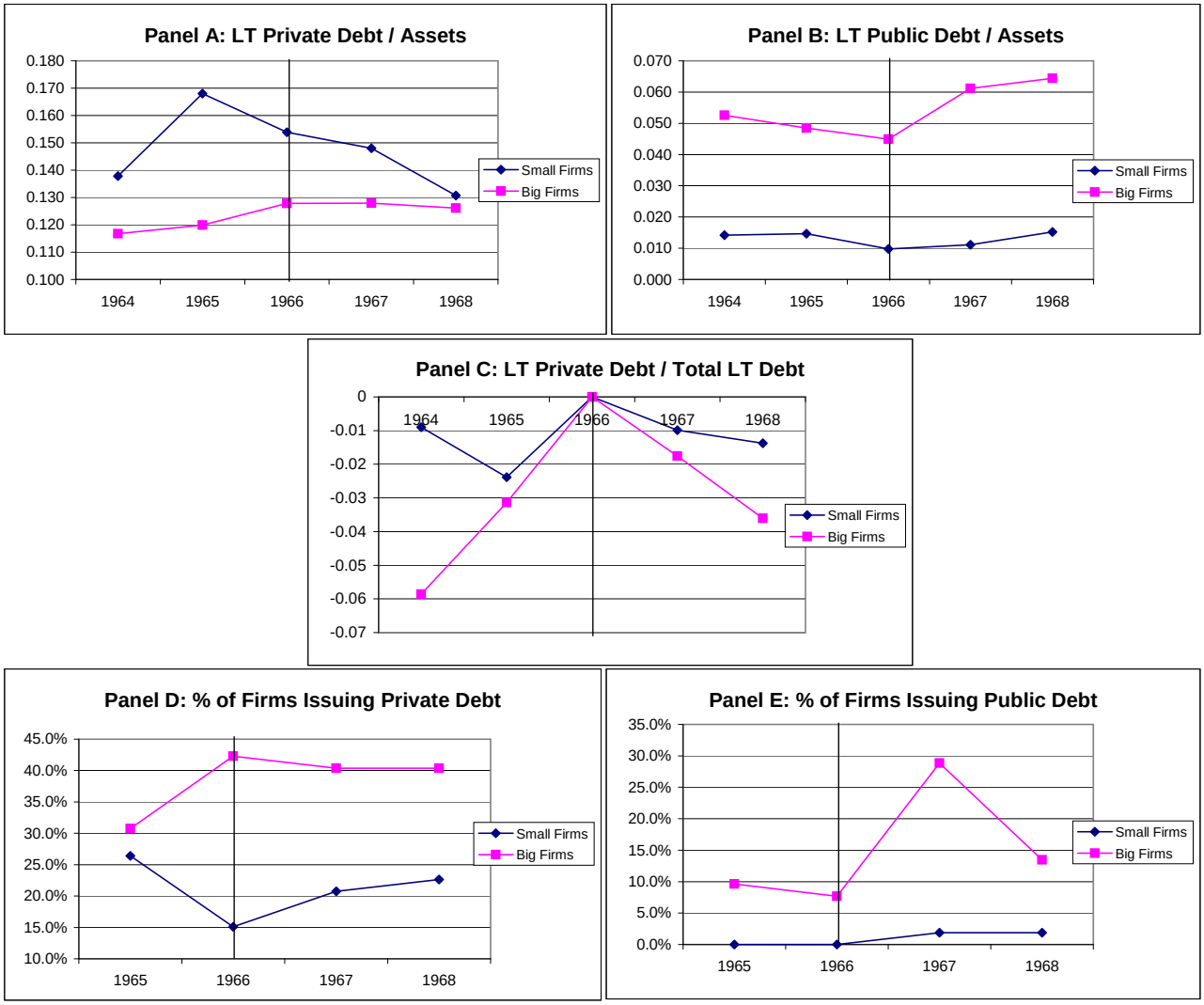

Figure 5

Interest Rates and the Bank-Non Bank Debt Mix

The real interest rate, calculated as the 3-month constant maturity Treasury bill yield minus expected inflation, as measured by the Livingston Survey, is plotted on the left-hand axis. The ratio of long term bank debt to non-bank debt for the small firm group, minus that of the large firm group, using data from the *Quarterly Report for Manufacturing*, is plotted on the right-hand axis. Small and large firms are defined as in Figure 3. The solid and dashed vertical lines mark, respectively, the beginning and end of the credit crunches of 1966 and 1969.

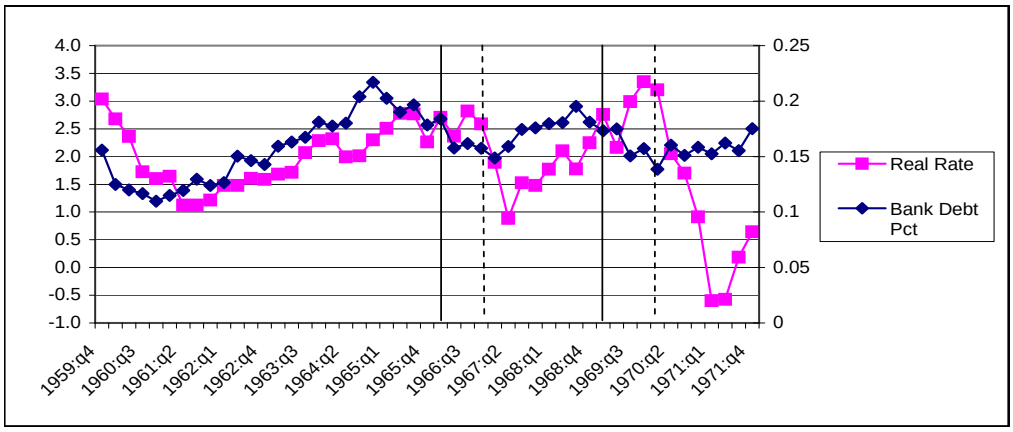

Table 1

Capital Structure Summary Statistics

Data for the first five rows in each panel are from the *Quarterly Report for Manufacturing*. Small firms include those with book value of assets between $1 million and $10 million; large firms include those with book value of assets greater than $100 million. Data on public debt outstanding are from *Moody's Industrial Manuals* from 1964 through 1968, based on a random sample of 100 firms, fifty each from the highest and lowest book asset deciles of manufacturing firms in both Moody's and Compustat in 1966.

Panel A: Small Firms

	1960	1962	1964	1966	1968
Total Debt / Assets	15.1%	16.7%	18.3%	19.0%	20.5%
ST Debt / Assets	6.3%	6.0%	5.9%	6.3%	6.7%
Long-term Bank Debt / Assets	2.2%	2.6%	3.5%	4.2%	4.7%
Long-term Non-Bank Debt / Assets	6.6%	8.1%	8.9%	8.5%	9.1%
LT Bank Debt / LT total Debt	24.7%	24.4%	27.9%	33.3%	34.2%
LT Public Debt / LT total Debt	n.a.	n.a.	6.7%	5.8%	7.2%

Panel B: Large Firms

	1960	1962	1964	1966	1968
Total Debt / Assets	15.7%	15.3%	14.8%	16.5%	20.2%
ST Debt / Assets	2.0%	1.7%	1.6%	2.4%	3.0%
Long-term Bank Debt / Assets	1.7%	1.6%	1.3%	2.1%	2.8%
Long-term Non-Bank Debt / Assets	12.0%	12.0%	11.9%	12.0%	14.4%
LT Bank Debt / LT total Debt	12.2%	11.8%	10.2%	14.9%	16.2%
LT Public Debt / LT total Debt	n.a.	n.a.	34.4%	28.5%	32.1%

Table 2

Impact of Events on Total Leverage

The table presents estimates of equation (4) using annual *Compustat* data from 1958 through 1964 (Panel A) and 1963 through 1968 (Panel B). The dependent variable is the sum of short-term and long-term debt divided by book assets. Manufacturing firms include firms with sic codes between 2000 and 3999. All Industries includes all firms except for financial and utility firms. Firms involved in major mergers or acquisitions are excluded. *BankDependent* is an indicator variable equal to 1 for small firms and 0 for large firms defined, respectively, as firms in the two lowest and two highest book asset deciles in each year. *CD Period* is an indicator equal to 1 after the emergence of the negotiable CD market in 1961 and 0 before. *Crunch* and *PostCrunch* are indicator variables equal to 1 during and after, respectively, the 1966 Credit Crunch and 0 otherwise. *Size* is defined as the natural logarithm of net sales. *Profitability* is defined as operating income scaled by the book value of assets. *Tangibility* is defined as net property plant and equipment scaled by the book value of assets. *MA/BA* is defined as the ratio of the market value to the book value of assets, where market value of assets is defined as book assets minus book equity plus the market value of equity. *GDPgrowth* is the four-quarter growth rate of real GDP. *ExpInfl* is the median one-year forecasted growth rate of the Consumer Price Index taken from the Livingston Survey. Standard errors, adjusted for heteroskedasticity across firms and serial correlation within firms, assuming an AR(1) structure, are shown in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Emergence of Negotiable CD

	Manufacturing Firms					All Industries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.216***	0.249***	0.251***	0.195***	0.256***	0.432***	0.028***
	(0.007)	(0.008)	(0.008)	(0.003)	(0.008)	(0.014)	(0.027)
Bank Dependent		0.007		-0.033***	-0.026***	-0.033***	-0.025
		(0.006)		(0.006)	(0.007)	(0.013)	(0.015)
CD Period			-0.001	-0.003	-0.005	-0.003	-0.003
			(0.003)	(0.002)	(0.003)	(0.003)	(0.004)
BankDep*CDPeriod				0.015**	0.026***	0.021**	0.027***
				(0.006)	(0.006)	(0.009)	(0.009)
Size	0.003***						
	(0.001)						
Profitability	-0.375***	-0.432***	-0.433***		-0.441***		-0.413***
	(0.015)	(0.022)	(0.022)		(0.022)		(0.04)
Tangibility	0.042***	0.037***	0.042***		0.042***		0.116***
	(0.01)	(0.013)	(0.012)		(0.012)		(0.034)
MA / BA	-0.005***	-0.007***	-0.007***		-0.007***		-0.001
	(0.002)	(0.002)	(0.002)		(0.002)		(0.004)
GDPgrowth		0.003	-0.005		-0.001		0.025
		(0.049)	(0.048)		(0.047)		(0.086)
ExpInfl		-0.029	0.243		0.142		-0.589
		(0.54)	(0.608)		(0.593)		(0.957)

Panel B: 1966 Credit Crunch

	Manufacturing Firms					All Industries	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	0.267***	0.191***	0.213***	0.169***	0.224***	0.329***	0.34***
	(0.012)	(0.017)	(0.017)	(0.003)	(0.009)	(0.111)	(0.018)
Bank Dependent		0.035***		0.001	0.024***	-0.019*	-0.002
		(0.012)		(0.006)	(0.006)	(0.012)	(0.011)
Crunch			0.0003	0.019***	0.0195**	0.014	0.0162
			(0.017)	(0.003)	(0.008)	(0.003)	(0.01)
Post Crunch			-0.007	0.041***	0.035***	0.026	0.026
			(0.028)	(0.003)	(0.013)	(0.004)	(0.017)
BankDep*Crunch				-0.025***	-0.019***	-0.019***	-0.016**
				(0.006)	(0.006)	(0.006)	(0.007)
BankDep*Post Crunch				-0.06***	-0.05***	-0.039***	-0.033***
				(0.007)	(0.007)	(0.008)	(0.011)
Size	-0.001						
	(0.002)						
Profitability	-0.418***	-0.378***	-0.389***		-0.447***		-0.387***
	(0.03)	(0.028)	(0.034)		(0.019)		(0.038)
Tangibility	0.079***	0.106***	0.091***		0.07***		0.158***
	(0.023)	(0.027)	(0.029)		(0.011)		(0.033)
MA / BA	-0.008***	-0.011***	-0.006**		-0.012***		-0.01***
	(0.002)	(0.002)	(0.003)		(0.001)		(0.002)
GDPgrowth		0.052	-0.087		0.091		0.048
		(0.071)	(0.197)		(0.087)		(0.11)
ExpInfl		1.839***	0.142		0.058		-0.292
		(0.31)	(1.122)		(0.623)		(0.823)
Industry Dummies	No	No	No	No	No	Yes	Yes

Table 3

Impact of Events on Debt-Equity Choice

The table presents probit estimates where the dependent variable equals 1 if, conditional on a debt or equity issuance, the firm issues equity, and 0 otherwise. A debt issuance is defined as a net increase in total (short term plus long term) debt outstanding greater than one percent of beginning- of-year book assets. An equity issuance is defined as the product of (1) the split-adjusted growth in shares and (2) the average of the split adjusted stock price at the beginning and end of the fiscal year, in excess of one percent of book assets. Dual issuances (debt and equity in the same year) are excluded. Data are the same as for the Manufacturing Firms sample described in Table 2. Other variables are defined as in Table 2. Standard errors, adjusted for clustering at the firm level, are shown in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Introduction of Negotiable CD		1966 Credit Crunch	
Constant	-1.425***	Constant	1.613***
	(0.321)		(0.44)
Bank Dependent	0.442*	Bank Dependent	-0.261
	(0.265)		(0.197)
CD Period	-0.228	Crunch	-0.523***
	(0.164)		(0.198)
		PostCrunch	-0.263
			(0.186)
BankDep * CDPeriod	-0.774***	BankDep * Crunch	0.441
	(0.293)		(0.273)
		BankDep * PostCrunch	0.813***
			(0.24)
Tangibility	0.046	Tangibility	-1.03***
	(0.393)		(0.374)
Profitability	0.595	Profitability	1.749**
	(0.782)		(0.841)
MA / BA	0.56***	MA / BA	0.277***
	(0.088)		(0.065)
Stock Return	0.588***	Stock Return	0.228**
	(0.178)		(0.094)
Leverage	1.717***	Leverage	1.613***
	(0.481)		(0.44)
GDPgrowth	3.401	GDPgrowth	-2.052
	(3.43)		(3.488)

Table 4

Use of Bank Debt by Bank-Dependent Firms

Data are from the *Quarterly Report for Manufacturing* from 1958Q4 through 1963Q4. Sample includes firms with book value of assets between $1 million and $10 million. The dependent variable is long-term bank debt as a percent of total long-term debt outstanding. *CD Period* is an indicator equal to 1 after the emergence of the negotiable CD market in the first quarter of 1961 and 0 before. *Earnings Volatility* is defined as the standard deviation of operating income as a percent of assets over the preceding twelve quarters. Other variables are as defined in Table 2. Standard errors, adjusted for heteroskedasticity across firms and serial correlation, assuming an AR(1) structure, within firms are shown in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Introduction of Negotiable CD		1966 Credit Crunch	
Constant	0.821***	Constant	0.204
	(0.154)		(0.155)
CD Period	0.031**	Crunch	-0.034**
	(0.015)		(0.014)
		Post Crunch	-0.037
			(0.024)
MA / BA	-0.042***	MA / BA	0.003
	(0.011)		(0.008)
Tangibility	-1.186**	Tangibility	0.14
	(0.52)		(0.513)
Leverage	0.26	Leverage	0.099
	(0.281)		(0.319)
Earnings Volatility	-20.036***	Earnings Volatility	10.587*
	(6.244)		(5.522)
GDPgrowth	0.062	GDPgrowth	-0.122
	(0.17)		(0.291)
ExpInfl	3.067	ExpInfl	0.028
	(2.574)		(1.25)

Table 5

Percentage of Debt Owed to Banks

Data are from the *Quarterly Report for Manufacturing* from 1958Q4 through 1963Q4 (Panel A) and 1963Q4 through 1968Q4 (Panel B). Small firms include those with book value of assets between $1 million and $10 million; large firms include those with book value of assets greater than $100 million. The dependent variable is long-term bank debt as a percent of total long-term debt outstanding. *CD Period* is an indicator equal to 1 after the emergence of the negotiable CD market in the first quarter of 1961 and 0 before. *Crunch* and *PostCrunch* are indicator variables equal to 1 during (1966Q2 through 1966Q3) and after, respectively, the 1966 Credit Crunch and 0 otherwise. *Earnings Volatility* is defined as the standard deviation of operating income as a percent of assets over the preceding twelve quarters. *Leverage* is the residual from a regression of total leverage ratio on the other included firm-specific independent variables. Other variables are as defined in Table 2. Standard errors, adjusted for heteroskedasticity across firms and serial correlation, assuming an AR(1) structure, within firms are shown in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

Panel A: Introduction of Negotiable CD

	(1)	(2)	(3)	(4)	(5)
Constant	0.183***	0.155*	0.692***	0.093***	0.152**
	(0.042)	(0.054)	(0.047)	(0.007)	(0.059)
Bank Dependent		0.134***		0.253***	0.233***
		(0.023)		(0.018)	(0.027)
CD Period			0.006	-0.012**	-0.008*
			(0.01)	(0.005)	(0.007)
BankDep * CDPeriod				0.037**	0.036**
				(0.014)	(0.014)
Size	-0.0358***				
	(0.005)				
MA / BA	-0.001	-0.005	-0.021		-0.014
	(0.006)	(0.007)	(0.011)		(0.009)
Tangibility	0.391***	-0.12	-1.539***		-0.149
	(0.175)	(0.13)	(0.1)		(0.144)
Leverage	-0.425**	-0.19	0.215*		0.229
	(0.132)	(0.134)	(0.233)		(0.153)
Earnings Volatility	5.201**	4.662	21.484***		5.484
	(1.998)	(2.208)	(3.371)		(2.554)
GDPgrowth		-0.065	-0.129		-0.045
		(0.057)	(0.1)		(0.064)
ExpInfl		-0.003	-0.439		0.181
		(0.611)	(1.322)		(0.825)

Panel B: 1966 Credit Crunch

	(1)	(2)	(3)	(4)	(5)
Constant	0.31***	0.204***	0.47***	0.087***	0.209***
	(0.043)	(0.046)	(0.036)	(0.007)	(0.042)
Bank Dependent		0.125***		0.191***	0.15***
		(0.019)		(0.013)	(0.019)
Crunch			-0.005	0.008	0.019**
			(0.01)	(0.007)	(0.009)
Post Crunch			0.005	0.008	0.028*
			(0.016)	(0.008)	(0.014)
BankDep * Crunch				-0.029**	-0.036***
				(0.012)	(0.012)
BankDep * Post Crunch				-0.033**	-0.042***
				(0.015)	(0.014)
Size	-0.029***				
	(0.005)				
MA / BA	0.021***	0.016**	0.004		0
	(0.006)	(0.008)	(0.008)		(0.007)
Tangibility	0.118	-0.268**	-1.039***		-0.342***
	(0.176)	(0.119)	(0.077)		(0.111)
Leverage	0.612***	0.362**	-0.039		-0.29*
	(0.131)	(0.154)	(0.193)		(0.158)
Earnings Volatility	-7.439**	-0.212	14.848***		2.481
	(2.975)	(3.37)	(3.294)		(3.296)
GDPgrowth		-0.019	0.185		0.207
		(0.144)	(0.219)		(0.175)
ExpInfl		1.594***	-0.54		-0.581
		(0.487)	(0.797)		(0.642)

Table 6

Average Change in Debt (percent of assets) **Surrounding the 1966 Credit Crunch**

Data are from *Moody's Industrial Manual* from 1964 through 1969. The small (large) firms group consists of a random sample of 50 firms from the lowest (highest) book asset decile of manufacturing firms in both Moody's and Compustat in 1966.

Panel A: Small Firms

year	Short Term Debt	Long Term Debt			
		Private	Public		
			Straight	Conv	Total
1965	0.000	3.58	0.16	-0.20	-0.04
1966	0.003	-0.21	-0.02	-0.34	-0.37
1967	-0.001	-0.54	0.00	0.04	0.04
1968	-0.001	1.45	0.00	0.84	0.84

Panel B: Large Firms

year	Short Term Debt	Long Term Debt			
		Private	Public		
			Straight	Conv	Total
1965	0.001	1.69	0.29	-0.18	0.11
1966	0.001	2.75	-0.19	0.42	0.23
1967	0.001	2.16	2.42	0.06	2.48
1968	0.000	1.53	0.41	0.85	1.26

Table 7

Impact of Credit Crunch on Public Debt Issuance

Data are from *Moody's Industrial Manual* from 1964 through 1969. The small firms group consists of a random sample of 50 firms from the lowest book asset decile of manufacturing firms in both Moody's and Compustat; the large firm group consists of a similar random sample from the upper decile. The dependent variable is long-term public debt as a percent of total long-term debt outstanding. Other variables are defined as above. Standard errors, adjusted for heteroskedasticity across firms and serial correlation, assuming an AR(1) structure, within firms are shown in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)	(5)
Constant	-0.043**	0.007	0.054	0.009	0.003
	(0.017)	(0.018)	(0.039)	(0.007)	(0.02)
Public Access		0.204***		0.256***	0.259***
		(0.019)		(0.024)	(0.023)
Crunch			0.029	0.005	0.006
			(0.035)	(0.004)	(0.017)
Post Crunch			0.064	0.01**	0.018
			(0.061)	(0.005)	(0.032)
Public Access * Crunch				0.013	0.017
				(0.014)	(0.016)
Public Access * Post Crunch				0.041**	0.041**
				(0.019)	(0.021)
Size	0.035***				
	(0.003)				
MA / BA	-0.002	-0.0003	-0.015**		-0.002
	(0.002)	(0.003)	(0.006)		(0.003)
Tangibility	-0.029	-0.005	0.17***		-0.022
	(0.031)	(0.033)	(0.062)		(0.038)
Leverage	-0.010	0.001	0.005		-0.002
	(0.023)	(0.023)	(0.056)		(0.027)
GDPgrowth		0.018	0.638*		0.206
		(0.089)	(0.371)		(0.215)
ExpInfl		-0.137	0.788		0.183
		(0.417)	(2.988)		(1.536)

Table 8

Interaction of Credit Conditions with Faulkender-Petersen Results

The table presents estimates of equation (4) using annual Compustat data from 1965 through 2000. The dependent variable is the sum of short-term and long-term debt divided by book assets. *PubAcc* is an indicator equal to 1 (0) for firms in the upper (lower) three firm size deciles in each year. *Q* is an indicator equal to 1 in years when Regulation Q interest rate ceilings were binding. *Standards* is the annual average of the net percentage of loan officers reporting tighter credit standards for commercial and industrial loans over the previous quarter, taken from the Federal Reserve Board's Senior Loan Officer Opinion Survey on Bank Lending Practices. *FedFund Spread* is the spread between the Federal Funds rate and the rate on 10-year constant maturity Treasury bonds. *Size* is defined as the natural logarithm of the market value of assets in 1992 dollars. Firm age is the number of years since the firm first appeared in the Compustat database. *R&D/Sales* and *Advertising /Sales* are, respectively, the ratios of research and development expense and advertising expense to sales. *Stock return* is the one-year firm specific equity return. *Regulated* is an indicator equal to 1 for firms in regulated utilities industries (sic 4900-4949). Other variables are as defined above. Robust standard errors, adjusted for clustering at the firm level are shown in parentheses. *, **, and *** denote significance at the 10%, 5% and 1% levels, respectively.

	(1)	(2)	(3)	(4)
Constant	0.292***	0.293***	0.284***	0.29***
	(0.008)	(0.008)	(0.008)	(0.008)
PubAcc	0.076***	0.075***	0.075***	0.079***
	(0.007)	(0.007)	(0.008)	(0.007)
PubAcc*Q		0.006**		
		(0.003)		
PubAcc*Standards			0.001***	
			(0.0001)	
PubAcc*FedFund Spread				0.004***
				(0.001)
Sales	-0.015***	-0.015***	-0.016***	-0.015***
	(0.001)	(0.001)	(0.001)	(0.001)
Firm Age	-0.008***	-0.008***	-0.008***	-0.008***
	(0.002)	(0.002)	(0.002)	(0.002)
Profitability	-0.019***	-0.019***	-0.017***	-0.019***
	(0.005)	(0.005)	(0.005)	(0.005)
Tangibility	0.161***	0.161***	0.162***	0.161***
	(0.008)	(0.008)	(0.008)	(0.008)
MA / BA	-0.033***	-0.033***	-0.031***	-0.033***
	(0.002)	(0.002)	(0.002)	(0.002)
R&D/Sales	-0.037***	-0.037***	-0.033***	-0.037***
	(0.006)	(0.006)	(0.006)	(0.006)
Advertising /Sales	-0.091**	-0.09**	-0.082**	-0.09**
	(0.039)	(0.039)	(0.039)	(0.039)
Stock Return	-0.0241***	-0.0239***	-0.0213***	-0.0239***
	(0.00121)	(0.00121)	(0.00129)	(0.0012)
Regulated	0.096***	0.096***	0.101***	0.096***
	(0.006)	(0.006)	(0.006)	(0.006)
GDP growth	-0.238***	-0.246***	-0.045	-0.138***
	(0.026)	(0.026)	(0.031)	(0.034)
Exp Inflation	0.472***	0.454***	0.507***	0.443***
	(0.05)	(0.05)	(0.052)	(0.05)

Table 9

Debt Issuance and Interest Rates

The table presents the average number of public debt issuances per month, where months are classified into historical yield deciles based on the ranking of the 3-month Treasury bill rate in the current month relative to the previous 120 months. The column labelled 1970-2001 reproduces the results from Table 6 of Barry et al. (2005). The sample of public debt issues used in the column labelled 1960-1971 is obtained from the Investment Dealer's Digest 10-year Summary of Corporate Financing.

	Average Issuances per Month	
Historical Yield Decile	1970-2001	1960-1969
0	71	n.a.
1	51	n.a.
2	43	16
3	42	13
4	41	14
5	34	16
6	21	13
7	21	17
8	23	13
9	27	20