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Do Banks Provide Financial Slack?

CHARLES J. HADLOCK and CHRISTOPHER M. JAMES*

ABSTRACT

We study the decision to choose bank debt rather than public securities in a firm's marginal financing choice. Using a sample of 500 firms over the 1980 to 1993 time period, we find that firms are relatively more likely to choose bank loans when variables that measure asymmetric information problems are elevated. The sensitivity of the likelihood of choosing bank debt to information problems is greater for firms with no public debt outstanding. These results are consistent with the hypothesis that banks help alleviate asymmetric information problems and that firms weigh these information benefits against a wide range of contracting costs when choosing bank financing.

WHY DO SOME FIRMS BORROW from public sources while others rely exclusively on private lenders? The answer to this question is not well understood. Existing theories suggest that a firm must consider the tradeoff between the benefits and costs of bank debt financing relative to other potential financing choices. The potential benefits of bank financing include low moral hazard and adverse selection costs and ease of renegotiation in financial distress.[1] The potential costs of bank financing include monitoring costs, suboptimal liquidation outcomes, and distortions induced by information monopolies.[2]

The goal of this paper is to identify whether adverse selection problems influence a firm's choice between new bank debt, public debt, or common stock. In particular, we are interested in assessing the empirical validity of the hypothesis that banks have the ability to accurately price a firm's claims, thus inducing a preference for firms that are undervalued by the market to

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[1] A large literature on financial intermediation explores the role of banks in resolving moral hazard and adverse selection problems. Prominent examples include Diamond (1984, 1991), Ramakrishnan and Thakor (1984), Berlin and Loeys (1988), Hoshi, Kashyap, and Scharfstein (1993), and Chemmanur and Fulghieri (1994). See Blackwell and Kidwell (1988) on transactions costs and James (1995) on the role of banks in financial distress.

[2] Rajan (1992) presents a model of effort distortion arising from information monopolies. See Diamond (1993) on suboptimal liquidation when firms use bank or short-term debt.

choose bank finance.[3] Our analysis is motivated by existing "pecking order" or market timing models, which suggest that firms tend to sell common stock, and, to a lesser extent, risky public debt, when their securities are overvalued by outsiders (i.e., the public). If, as many have argued, banks can be viewed as insiders, then similar reasoning would suggest that firms that are undervalued by the public markets will be more likely to choose bank debt. We will refer to the possibility that banks can accurately price a firm's claims, thus alleviating adverse selection problems, as the *information benefit* of bank debt financing.

In choosing to use bank debt, a firm must weigh these information benefits against several potential costs that may be induced by a bank debt contract. These potential costs include agency costs, monitoring costs, financial distress costs, information monopoly costs, and transactions costs. A firm's financing choice will depend not on the absolute magnitude of these costs, but rather on the magnitude of these costs relative to the firm's other potential financing choices. For ease of exposition, we will use the term *relative contracting costs* to refer to the aggregate size of these contracting costs for bank debt relative to public securities.

Previous research suggests that these relative contracting costs will vary across firms. For firms where bank debt has many advantages over public debt—for example, small and/or risky firms—we expect that the relative contracting costs will be either small (and positive) or negative. For these firms, it is almost certain that the information benefit of bank debt will dwarf the small or negative relative contracting costs. Thus, it will take very little (if any) security mispricing by the public to induce these firms to choose bank debt finance. In contrast, for other firms, the relative contracting costs of bank debt could be quite substantial. For example, large firms that borrow frequently in the public debt markets may find the monitoring benefits of bank borrowing to be quite small while the transactions and monitoring costs are relatively high. For these types of firms, we expect that the information benefit of bank debt financing must be quite high to induce a firm to choose bank debt given its relatively high contracting costs. Consequently, in these situations, we expect that a firm must exhibit a great deal of security mispricing (i.e., undervaluation) to induce them to choose bank debt as their marginal source of finance.

To investigate whether adverse selection considerations play a role in determining a firm's decision to use bank debt, we follow a sample of 500 firms over the 1980 to 1993 time period. For this sample, we identify all publicly announced instances of bank loan agreements, public debt offerings, and common stock offerings. Using these data, we estimate logit models predicting the likelihood that a firm chooses bank finance as opposed to public debt or common stock.

[3] Our focus on the role of private lenders in mitigating adverse selection problems is in the spirit of prior work by Mackie-Mason (1990). Specifically, he proposes a modified pecking order in which firms prefer retained earnings over new share issues and private debt over public debt when information problems are severe.

If adverse selection considerations play a role in determining the decision to use bank debt, we expect that variables which proxy for potential security undervaluation by the public markets should display positive coefficients in our logit models. Since firms with a great deal of stock return volatility are likely to have substantial asymmetric information between insiders and outsiders which can lead to undervaluation (e.g., Dierkens (1991)), we use return volatility as one proxy for potential undervaluation. In addition to volatility, we also consider the run-up in a firm's stock price prior to an issue. The prior literature (e.g., Lucas and McDonald (1990)) identifies issuing firms with large stock price run-ups as being more likely to be either fairly valued or overvalued by the market, and thus firms with small stock price run-ups should tend to be the more undervalued firms. When we estimate our logit models, we find that firms with high return volatility and low stock price run-ups are indeed more likely to announce a new bank loan. This evidence is consistent with our hypothesis that adverse selection problems arising from security undervaluation influence a publicly traded firm's decision to use bank debt financing.[4]

In addition to our basic logit results, we consider the possibility that the sensitivity of the likelihood of choosing a bank loan to our undervaluation proxy variables will vary with firm characteristics. To conduct this analysis, we attempt to identify firms where the relative contracting costs of bank debt are low versus firms where the relative contracting costs of using bank debt are high. As outlined above, for the set of firms where these relative contracting costs are low, it should take very little security market undervaluation to drive these firms to choose bank debt, and thus for these firms we should observe a very pronounced sensitivity of bank loan likelihood to our undervaluation variables. In contrast, for the set of firms where these relative contracting costs are very high, it should take a great deal of security market undervaluation for the firm to cross the threshold where bank debt is the optimal choice. Thus, these firms should exhibit a smaller sensitivity of bank loan likelihood to the undervaluation variables.

As a proxy for the relative contracting costs of bank debt, we use a dummy variable indicating whether or not a firm has any public debt outstanding. For firms with no public debt outstanding, the fact that the firm has not issued public debt is likely to indicate that the contracting costs of bank debt are relatively low compared to public debt. For a firm with public debt outstanding, the fact the firm has chosen public debt in the past indicates that bank debt is likely to have relatively higher contracting costs.

Consistent with our predictions, when we include terms interacting this public debt dummy variable with our undervaluation proxy variables, we find that the sensitivity of the likelihood of choosing a bank loan to these variables is significantly smaller for the firms with public debt outstanding. Taken as a

[4] Clearly for small privately held firms, the decision to use bank debt versus alternative sources of private financing will depend on the contracting costs of bank debt relative to other sources of financing. See for example, Carey, Post, and Sharpe (1998).

whole, these results indicate that (1) there is an information benefit to bank debt finance that tends to push undervalued firms towards using bank debt, and (2) firms weigh these information benefits against a wide range of other contracting costs in deciding whether bank debt is their optimal choice.

We supplement these logit results with an analysis of the market reactions to the financing announcements in our sample. Similar to the findings of James (1987) and others, the overall market reaction to our sample bank loan announcements is significantly positive. This is consistent with our hypothesis that undervalued firms tend to use bank debt. When we regress bank loan announcement returns on a variety of explanatory variables, we find some evidence that these market reactions are positively related to variables that measure potential security market undervaluation. However, small sample sizes and multicollinearity issues limit our ability to draw strong inferences from these regressions.

Taken as a whole, our evidence is highly consistent with the notion that one of the benefits of bank debt is that it allows undervalued firms to avoid adverse selection problems in the public securities markets. This conclusion is consistent with the academic and practitioner literature on the value of bank commitment based lending for large publicly traded firms. Specifically, as James and Smith (2000) and Kashyap, Rajan, and Stein (1999) point out, most bank lending to publicly traded firms is conducted through loan commitments. One advantage of commitment-based lending is that it allows firms to raise private financing quickly when credit risk spreads look unattractive.[5] In effect, commitment financing provides firms with a type of "financial slack" that mitigates adverse selection problems associated with issuing public securities.[6]

The remainder of the paper is organized into four sections. In Section I, we review existing empirical evidence concerning the use of bank debt and we discuss where our paper fits in the context of this literature. In Section II, we describe our sample. The main empirical results of the paper are presented in Section III. In Section IV, we offer concluding remarks.

I. The Choice between Bank Debt and Public Securities

A. *The Information Benefits of Bank Debt Finance*

The benefits of bank financing arising from decreased adverse selection costs have been widely discussed in the literature. Theoretical papers in this area (e.g., Leland and Pyle (1977), Campbell and Kracaw (1980), and

[5] See, for example, Shockley and Thakor (1997). Most lines-of-credit require the borrower to pay an interest rate that depends explicitly on a benchmark rate such as LIBOR or prime. Thus, one benefit of commitments is that they provide insurance against changes in credit risk spreads.

[6] Myers and Majluf (1984) use this term to refer to cash holdings, marketable securities, or the ability to issue default-risk-free debt. The ability to issue fairly priced claims serves the same function as financial slack in avoiding adverse selection problems.

Ramakrishnan and Thakor (1984)) generally predict that "information-problematic" borrowers will have a preference to borrow from private lenders. The basic assumption underlying many of these models is that private lenders have a comparative advantage in pricing the securities of firms that are difficult to value.

Several pieces of empirical evidence support this adverse selection motivation for using bank debt finance. First, the study by James (1987) establishes that the market reaction to bank loan announcements is on average positive, suggesting that undervalued firms are attracted to bank financing. In addition, Best and Zhang (1993) find that bank loan announcements convey more information when stock analyst forecast errors are large and when their most recent revisions were negative or unchanged. Since analyst forecast error should proxy for asymmetric information and therefore the potential for undervaluation, this evidence is also consistent with the adverse selection motivation for using bank debt. Finally, Houston and James (2001) report that bank-dependent borrowers face higher costs of nonbank external financing. This finding suggests that some firms rely heavily on bank debt because of difficulties in accessing the public securities markets at attractive terms.

B. The Relative Contracting Costs of Bank Debt Finance

There is a large literature that compares the contracting benefits and costs of bank debt contracts compared to public debt contracts. This literature includes comparisons of (1) the agency costs of debt financing, (2) recontracting flexibility in financial distress, and (3) flotation and transactions costs. While these comparisons each emphasize different aspects of banking relationships, we view them as complementary rather than competing factors in the decision to choose bank financing.

The literature on the agency costs of debt financing emphasizes that banks can provide costly monitoring services that can mitigate asset substitution and underinvestment problems.[7] Relative to public debt, firms with little reputational capital or firms with substantial growth options will often find that the benefits of these monitoring services in terms of reduced agency problems exceed the costs (i.e., the relative contracting costs of bank debt compared to public debt in this case are negative), while other, more established firms, will not. However, as Rajan (1992), Diamond (1993), and Gilson and Warner (1999) point out, there can be a dark side to close banking relationships arising from incentive problems when a bank has an information monopoly or excessive control over a firm.

Several empirical studies are consistent with the importance of monitoring costs and monitoring services in determining a firm's mix of private and public debt securities. For example, Houston and James (1996) and

[7] See, for example, Smith and Warner (1979), Diamond (1984, 1991), Berlin and Loeys (1988), Rajan (1992), Hoshi et al. (1993), Rajan and Winton (1995), and Gilson and Warner (1999).

Krishnaswami, Spindt, and Subramaniam (1999) find that firms with greater growth opportunities rely more heavily on private sources for debt finance. Houston and James also find that potential holdup problems limit a firm's use of bank debt, and they report that the presence of multiple banking relationships or access to the public debt markets can reduce these holdup problems. Finally, Gilson and Warner (1999) find that the looser contractual restrictions associated with junk bond issues can lead firms to reduce their reliance on bank borrowings when faced with a decline in earnings.

The financial distress literature emphasizes that recontracting flexibility in financial distress can be a benefit of bank debt financing (e.g., Smith and Warner (1979), Gilson, John, and Lang (1990)). The flexibility arises from the fact that (1) bank debt is generally concentrated in the hands of a small number of lenders, (2) bank debt is not subject to the provisions of the Trust Indenture Act of 1939, and (3) bankers are presumed to be better informed than public debtholders with regard to a firm's continuation value. However, as Diamond (1993) and James (1995, 1996) point out, because bank debt is typically senior to public debt, firms with a combination of public debt and bank debt may lose out on this recontracting flexibility because of the incentives created by the debt's seniority structure.

Finally, empirical studies have identified some flotation cost differences between private and public debt. For example, Blackwell and Kidwell (1988), Carey et al. (1993), and Krishnaswami et al. (1999) provide evidence that flotation or issuance costs contain a fixed component that is larger for public debt issues than it is for private issues. In addition, Houston and James (1996) report that a firm's reliance on bank financing is inversely related to firm size, suggesting that issuance costs limit smaller firms' access to the public debt markets.

C. Marginal Financing Choices

Since bank debt has some potential benefits and some potential costs relative to a firm's other financing options, an important issue is to identify the empirical relevance of these various costs and benefits. The fact that many firms use bank financing indicates that the benefits of bank debt financing often outweigh the costs, but the existing empirical evidence does not fully identify the motives underlying this decision to use bank debt. As discussed in the introduction, the goal of our study is to assess the empirical validity of the hypothesis that banks have an ability to assess firm quality which induces a preference for undervalued firms to choose bank finance.[8] In other words, do the information benefits of bank debt finance matter? A secondary

[8] While we focus on the ability of banks to assess firm quality, Chemmanur and Fulghieri (1994) consider a model where banks have an ability to help firms in financial distress, and the likelihood of financial distress is private information known only to the firm. In their model, firms with a greater probability of financial distress are attracted to banks, which would appear to indicate that bank loan announcements should be bad news to the market.

goal of our analysis is to assess whether firms do in fact trade off these information benefits against the relative contracting costs associated with bank debt finance in making their financing choices.

Existing studies that attempt to examine the determinants of the bank debt choice focus on the composition of a firm's debt financing at a fixed point in time (e.g., Houston and James (1996), Krishnaswami et al. (1999)), rather than investigating incremental financing choices. While these cross-sectional studies are informative, they are not well-suited to examining the role of the information benefits of bank debt finance. For example, Krishnaswami et al. report only a weak relationship between future abnormal earnings and a firm's current use of bank debt, a finding that casts some doubt on the adverse selection motivation for using bank debt. However, since undervaluation by the public markets is likely to be temporary, overall debt structure at any point in time is unlikely to be finely tuned to a firm's current level of under- or overvaluation. Thus, it is doubtful that this type of cross-sectional test has much power for examining the adverse selection motivation for using bank debt. Cross-sectional differences in the use of bank debt are more likely to reflect past information problems as well as monitoring and agency costs.

In contrast to the cross-sectional studies, our focus is on examining a firm's marginal financing choice. In particular, we are interested in whether asymmetric information problems leading to undervaluation by the public markets will tend to push a firm towards the use of bank debt when they are in the market for external funds. We investigate this issue by examining whether variables that proxy for potential undervaluation by the public markets are systematically related to the likelihood of choosing new bank debt within a set of firms that access the external capital markets. As outlined in the introduction, we expect that firms with substantial stock return volatility and small run-ups in their stock price prior to an issue will tend to be the most undervalued firms represented in our sample. Our logit models examine whether these types of firms are, in fact, the ones who are most likely to announce a new bank loan.

To further explore the trade-offs between the information benefits of bank debt finance and the relative contracting costs arising from bank debt financing, we attempt to separate firms into a group where these relative contracting costs are high and a group where these relative contracting costs are likely to be either small or negative.[9] As we formally model in the Appendix, firms for whom the relative contracting costs are high must experience significant undervaluation by the public markets in order to choose bank debt (i.e., the information benefits must be very large to offset the other relative disadvantages of bank debt). Thus, for these firms, the coef-

[9] As we outline in the model of the Appendix, a firm's choice really depends on the relative contracting costs of bank debt versus public debt and the relative contracting costs of bank debt versus common stock. For expositional ease, we use the relative contracting costs term to refer to the overall contracting costs of bank debt relative to the leading alternative.

ficient reflecting the sensitivity of the bank debt choice to our proxies for undervaluation should be small in magnitude. In contrast, firms where the relative contracting costs are either small or negative will require very little undervaluation to cross the threshold where bank debt is the optimal financing choice. For these firms, the coefficients on the undervaluation proxy variables should be relatively larger in magnitude. As discussed earlier, we use past access to the public debt markets as a proxy variable indicating that a firm finds the relative contracting costs of bank debt to be high.

II. Data and Sample Selection

We study financing choices for a sample of 500 nonfinancial firms with data available on both the Compustat and CRSP files (NYSE/AMEX and Nasdaq). Half of these firms are the 250 firms used by Houston and James (1996). These firms were randomly selected from the subset of Compustat- and CRSP-listed firms with some long-term debt (maturity greater than one year) outstanding in 1980. We follow these 250 firms over the 1980 to 1993 time period. Firms drop out of the sample over time, leaving us with 117 firms in 1993. Since this sample generates only a limited number of bank loan announcements, we expand the sample by adding an additional 250 firms with some long-term debt outstanding in 1993. This 1993 sample is chosen to match the original sample in terms of size and industry characteristics. Specifically, for each firm in the original sample, we select a matching firm in the same four digit SIC industry with total 1993 book value of assets (in 1980 dollars) closest to the 1980 book value of assets of the firm in the original sample. If a match cannot be found in the same four digit SIC industry, we choose a matching firm based on the three digit SIC code. We follow these 250 matching firms from 1993 back to either 1980 or to the year the firm first appears on Compustat.[10]

We restrict our sample to large publicly traded firms with long-term debt outstanding for two reasons. First, these firms are the ones who are most likely to have the opportunity to borrow in the public markets. Consequently, these firms provide us with the opportunity to observe how access to the public debt markets affects the debt financing choice. Second, balance sheet and income statement information for these firms is available in machine-readable form on Compustat.

For each of the 500 sample firms, we collect detailed information on the firm's debt structure by examining annual reports and SEC 10K filings. Much of this information comes from the notes to the financial statements. The information we collect includes the source of debt (whether it is bank

[10] Since we follow the original sample forward from 1980 onwards, one may be concerned about survivorship biases. The matching sample mitigates this problem by starting with active firms in 1993 and working backwards in time. Given this sampling procedure, the matching sample may include younger and more bank-dependent firms. Our main empirical results do not vary significantly between the original sample and the matching sample.

debt, commercial paper, public debt, or other private debt), the maturity of each debt issue, the number of bank relationships a firm maintains, the number of public debt issues the firm has outstanding, whether the firm has commercial paper outstanding or a commercial paper program, the number of priority classes of public debt, and available lines of credit.

In many cases, the financial statements indicate whether debt is publicly or privately held, but does not identify the lender (i.e., whether or not the lender is a commercial bank). Following Houston and James (1996), we define bank borrowing broadly to include all borrowing referred to as bank debt as well as any private debt where the identity of the lender cannot be determined. We define other nonbank private borrowing to include all private debt where the lender is clearly not a bank (e.g., insurance companies, finance companies, pension funds). Given our broad definition of bank borrowing, our bank debt measure is likely to overstate the amount of borrowing from commercial banks.

As we discussed earlier, we expect that the decision to use bank debt will depend on whether a firm has accessed the public debt markets in the past. Thus, we create a dummy variable named *Public* which takes a value of one if a firm has long-term public debt or commercial paper outstanding, and otherwise takes a value of zero.[11] Given the high costs of data collection, we gather information on each firm's debt for the years 1980, 1985, 1990, and 1993. If there was a change in *Public* between these years, we collect information for the intervening years. Otherwise, we assume that *Public* was the same in each year over the interval.[12]

Our ultimate empirical goal is to estimate logit models of marginal financing choices. To collect data on these choices, we search the Dow Jones News Service (DJNS) for information on bank loan announcements, public straight debt offerings, and common stock issues. Specifically, using DJNS we search for articles and headlines containing the key words "line of credit," "loan agreement," "bank loan," "credit agreement," "credit line," "credit facility," "credit extension," "new loan," "loan renewal," "loan revision," "loan extension, "term loan," "debt issue," "debt offer," "public debt issue," "public debt offer," "debenture issue," "stock offer," "equity issue," "common stock issue," and "common stock offer." This search yielded 495 announcements.

In several instances, the announcement of a security issue or a new loan is accompanied by other news concerning dividends, earnings, or control activity. Most empirical studies exclude these "contaminated" announcements so as to focus solely on the information content of the financing news. However, in our investigation of the role of information problems in determining financing choices, the case for excluding these announcements is less clear.

[11] In a number of cases, the financial statements do not provide us with sufficient detail to distinguish public debt from private debt. In these cases, we assign *Public* a missing value.

[12] For example, if *Public* was zero in 1980 and 1985, we would assume that it was also zero in 1981, 1982, 1983, and 1984. Note that for the other debt variables, we follow the interpolation procedure outlined by Houston and James (1996).

For example, earnings or dividend announcements may reduce information asymmetries associated with selling securities; thus, excluding financing announcements with this type of contaminating information may bias the results. To account for this possibility, in our analysis we examine the entire sample of financing announcements and the subsample of "clean" financing announcements where we discard articles with potentially contaminating information such as news on dividends, earnings, or control activity. This clean subsample contains 102 common stock issues, 144 bank loans, and 156 straight public debt offerings. Our results are similar for the entire sample and the clean subsample, so we focus most of our discussion below on the clean subsample.

From the news stories concerning each financing announcement, we collect information on the amount of the offer and the purpose of the offer. In the case of bank loans, we also identify the number of banks participating in the deal and the identity of the lead bank or first bank listed. Finally, we add to our data concerning firm and offer characteristics by obtaining information on financial analysts' forecasts of company earnings from the Institutional Brokers' Estimate System (I/B/E/S) data tape. Actual earnings per share data are taken from either Compustat or the I/B/E/S tape.

Unlike most prior studies of public and private debt offerings (with the notable exception of Mikkelson and Partch (1986)), we examine the financing decisions of a fixed sample of firms over time. While our approach results in a smaller sample of financing announcements than in some other studies, it allows us to examine financing announcements in the context of the financial structure and history of the sample firms. In addition, this sample design allows us to assess the likelihood of a given type of financing announcement for a fixed set of firms.

III. Empirical Analysis

A. Descriptive Statistics on Patterns of Corporate Borrowing

In Table I, we present summary statistics pertaining to the financial characteristics of our sample firms. To examine changes over time, we present these statistics both for the overall sample (1980 through 1993) and for the sample in 1980 alone and in 1993 alone. As we report in the table, the average book value of assets for our sample firms is approximately $1.5 billion. However, since firm size is highly skewed, the median is a much smaller $128 million. Since public debt issues are typically $50 million or more and the median leverage ratio is 0.35, approximately half the firms in our sample are large enough to have made a debt offer of typical size. To assess the importance of bank debt and other forms of debt in corporate financing, we compute the total amount of nonmortgage-related debt for each observation. Total nonmortgage debt includes short-term debt plus long-term debt less mortgage debt, industrial revenue bonds, loans from stockholders, and cap-

Table I

Summary Statistics for Selected Firm Characteristics

The sample consists of 500 randomly selected publicly traded firms over the 1980 to 1993 time period. Data on the source of a firm's debt is derived from the notes to a firm's financial statements as reported in their 10K filings and annual reports. Other financial information is derived from Compustat. Figures are calculated over different sample sizes due to missing observations for some variables for some years. Assets refers to the book value of assets. Leverage equals short-term debt plus long-term debt divided by total assets. Coverage ratio equals earnings before interest, taxes, and depreciation divided by interest expense. Cash flow is equal to earnings before interest, taxes, and depreciation. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. Bank debt is all debt that is identified as bank debt or private debt where the lender cannot be identified. Short-term notes and term loans are assumed to be bank debt unless a nonbank lender is identified. Total debt is defined to be all short-term debt plus long-term debt less industrial revenue bonds, mortgages, loans from stockholders, and capitalized leases. Public debt includes all public bonds and commercial paper outstanding. Other private debt includes all privately placed bonds and notes and loans that are identified as being placed with nonbank private lenders (e.g., insurance companies and pension funds).

	Overall Sample		Sample in 1980		Sample in 1993	
	Mean	Median	Mean	Median	Mean	Median
Assets (1980 $ millions)	1,539	128	1,033	88	2,181	238
Leverage	0.38	0.35	0.35	0.34	0.40	0.39
Coverage ratio	7.06	2.38	9.09	4.00	9.69	3.11
Cash flow/assets	0.11	0.13	0.15	0.16	0.11	0.12
Market/book	1.31	1.11	1.20	1.00	1.52	1.24
Bank debt/total debt	0.67	0.81	0.66	0.79	0.71	0.88
Public debt/total debt	0.14	0.00	0.14	0.00	0.12	0.00
Other private debt/total debt	0.14	0.01	0.18	0.02	0.11	0.01
% of observations with public debt outstanding	38%		36%		39%	

italized lease obligations.[13] We exclude these other forms of debt from our total debt measure since our goal is to focus on financing choices made for general corporate purposes. All debt ratios are computed relative to this total nonmortgage debt measure.

As is clear from the figures in Table I, on average, bank debt is the largest source of debt financing for our sample firms. The mean and median proportions of bank debt to total debt are 0.67 and 0.81, respectively, while the corresponding figures for public debt are only 0.14 and 0.00. In total, only

[13] For firms with no debt outstanding, all debt ratios are set equal to zero. Excluding these observations does not qualitatively affect our results. Note that the debt sources we exclude in our calculations (e.g., mortgage debt, industrial revenue bonds, loans from stockholders, capitalized lease obligations) are on average quite small. For the entire sample, these sources amount to an average of 3.2 percent of all long-term debt.

38 percent of our sample observations are for firm-years where a firm had some public debt outstanding. For these observations, the mean proportion of public debt to total debt is 0.34.[14]

B. Determinants of the Use of Public Debt

As we discuss in the introductory sections, we expect firms to exhibit substantial heterogeneity in the contracting costs of bank debt relative to public debt or public equity. For example, small firms with substantial growth opportunities may find the contracting costs of public debt to be high relative to private debt, in which case we would expect these firms to avoid the public debt markets. As a prelude to our main analysis of marginal financing choices, in this subsection we examine differences between firms that access the public debt markets and firms that rely solely on the private debt markets.[15]

In Table II, we present summary statistics for observations grouped according to whether a firm has public debt outstanding. As the table illustrates, firms with public debt outstanding are on average larger, older, more highly levered, and have lower stock return volatility than the firms with no public debt.[16] We find no significant differences in the mean or median market-to-book ratios (a proxy for Tobin's q) between the two groups. Our finding that firms that use public debt are relatively larger is consistent with the view that there are economies of scale in issuing public debt, thus limiting access to the largest firms. The differences in leverage and stock return volatility are consistent with the argument that firms which use public debt have lower agency costs of debt financing and/or are less informationally opaque than firms that rely exclusively on private lenders.

To complement these simple univariate comparisons, in Table III, we present a multivariate logit model estimating the likelihood that a firm has some public debt in its capital structure. The logit model relates the likelihood of having outstanding public debt to a firm's contemporaneous financial characteristics. Consistent with the univariate analysis, we find that the likelihood of having public debt outstanding is positively related to firm size and leverage. In addition, the likelihood of using public debt is negatively related to stock return volatility. The other coefficients are insignificant. It is interesting that there is no significant relationship between the likelihood of using public debt and the firm's market-to-book ratio. One might expect that

[14] Note that the mean ratios in Tables I and II do not always add up to one because they are computed over different subsamples.

[15] Note that our focus is on examining incremental financing choices and not on the cross-sectional variation in a firm's mix between public and private debt claims. Several recent studies have argued that agency costs and information monopoly problems help explain the variation in this mix. These findings are certainly not inconsistent with ours. Informational problems could help explain incremental financing choices even if they are relatively unimportant in determining a firm's mix of debt claims. For example, firms may use bank debt to resolve information problems and then repay their loans when undervaluation problems are resolved.

[16] Houston and James (1996) and Krishnaswami et al. (1999) find similar differences.

Table II

Summary Statistics Grouped by the Use of Public Debt and Bank Debt

The sample consists of 500 randomly selected publicly traded firms over the 1980 to 1993 time period. Data on the source of a firm's debt is derived from the notes to a firm's financial statements as reported in their 10K filings and annual reports. Other financial information is derived from Compustat. Figures are calculated over different sample sizes due to missing observations for some variables for some years. Bank dependent firms are those with bank debt above the sample median who have no public debt outstanding. Assets refers to book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. Coverage ratio equals earnings before interest, taxes, and depreciation divided by interest expense. Cash flow is equal to earnings before interest, taxes, and depreciation. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. Bank debt is all debt that is identified as bank debt or private debt where the lender cannot be identified. Short-term notes and term loans are assumed to be bank debt unless a nonbank lender is identified. Total debt is defined to be all short-term debt plus long-term debt less industrial revenue bonds, mortgages, loans from stockholders, and capitalized leases. Public debt includes all public bonds and commercial paper outstanding. Other private debt includes all privately placed bonds and notes and loans that are identified as being placed with nonbank private lenders (e.g., insurance companies and pension funds). Stock return volatility is defined to be the standard deviation of a firm's daily stock returns in the prior year calculated using CRSP data.

	Firms without Public Debt		Firms with Public Debt		Bank-Dependent Firms	
	Mean	Median	Mean	Median	Mean	Median
Assets (1980 $ millions)	378*	81*	3,917	614	474*	81*
Age (in 1993)	33*	28*	44	42	38*	31*
Leverage	0.30*	0.33*	0.51	0.42	0.36*	0.31*
Coverage ratio	11.75*	3.56*	3.81	2.92	8.16*	3.46*
Cash flow/assets	0.12	0.13	0.12	0.13	0.13	0.13
Market/book	1.33	1.10	1.32	1.15	1.31	1.07
Bank debt/total debt	0.79*	0.95*	0.49	0.50	0.96*	1.00*
Public debt/total debt	0*	0*	0.34	0.29	0*	0*
Other private debt/total debt	0.18*	0.01	0.08	0.01	0.03	0.00
Capital expenditures/assets	0.01*	0.05	0.05	0.06	0.05	0.05
Property, plant, equipment/assets	0.32*	0.33	0.38	0.34	0.32*	0.29*
Cash and marketable securities/assets	0.09	0.03	0.07	0.04	0.08	0.04
Stock return volatility	3.00%*	2.60%*	2.66%	2.14%	3.04%*	2.60%*

* Figure differs from the corresponding figures for the firms with public debt group at the 0.10 level or higher.

the market-to-book ratio would be negatively related to the use of public debt, since this ratio is frequently used as a proxy for growth opportunities or the presence of intangible assets.[17]

[17] In alternative specifications, we experimented with using R&D expenditures as an alternative measure of growth opportunities. This variable was not significantly related to the use of public debt.

Table III

Logit Model of the Determinants of the Use of Public Debt

The dependent variable is a binary variable taking a value of one if the firm has public debt outstanding and zero otherwise. The estimated model is the logistic regression model with asymptotic t-statistics reported under the coefficient estimates. The sample consists of 500 randomly selected publicly traded firms over the 1980 to 1993 time period. Data on the source of a firm's debt is derived from the notes to a firm's financial statements as reported in their 10K filings and annual reports. Other financial information is derived from Compustat. Assets refers to the book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. Stock return volatility is defined to be the standard deviation of a firm's daily stock returns in the prior year, calculated using CRSP data.

Variable	Coefficient (asy. t-statistic)
Log(assets)	0.699 (24.693)
Age	−0.000 (−0.016)
Market/book	0.089 (1.451)
Stock return volatility	−12.322 (−4.777)
Leverage	1.528 (9.728)
Property, plant, and equipment/assets	−0.259 (−1.117)
Intercept	−5.203 (−23.444)
Pseudo R^2	0.14
N	3,763

C. *Financing Announcements*

We collect data on firm and offer characteristics for the common stock, straight public debt, and bank loan announcements identified by the search procedure outlined above. We report these figures in Table IVA for the sample of "clean" announcements and in Table IVB for the sample of all announcements. Abnormal returns associated with each financing announcement are calculated using the methodology of Mikkelson and Partch (1986).[18]

[18] In particular, for each financing announcement, we estimate market model parameters using the period from 250 to 10 days prior to the announcement. Using these parameters, we calculate a two-day prediction error and a standardized prediction error for the two-day period beginning the day prior to the news announcement.

As the tables illustrate, the abnormal stock returns for our sample of financing announcements are similar to those reported in earlier papers.[19] For example, for the sample of clean common stock issues, there is negative and significant average announcement return of −2.39 percent (z-statistic of −5.42). For clean straight debt issues, the average announcement return is negative but insignificant (z-statistic of −0.70). In contrast, for clean bank loan announcements, the average return is a significantly positive 1.45 percent (z-statistic of 3.44).

As Tables IVA and IVB illustrate, the size of the financing agreement varies by the type of financing. Surprisingly, the average size of announced bank loans or credit facilities is actually larger than the average size of public straight debt issues. This difference largely reflects more skewness in the size distribution of bank loan agreements as compared to public debt issues. As the tables illustrate, the median bank loan size is less than half of the size of the median public debt issue. This skewness reflects the fact that there are a few very large bank credit agreements in the sample, while at the same time, approximately 40 percent of the bank loan announcements are made by relatively small firms who generally do not issue public debt. If we look only at firms with public debt outstanding, the mean and median size of announced bank loans are $224 million and $83 million, respectively. Since public debt issues generally require a minimum issue size of between $50 million and $100 million, on the basis of offer size it appears that public debt is a viable alternative to bank debt for most of the sample firms that have public debt outstanding.[20]

As the figures in the tables indicate, the bank loans in our sample are not only large in absolute magnitude, they are also large relative to the size of the borrowing firm. For example, focusing on the clean announcements, the average ratio of the size of the loan agreement to the market value of the borrower's equity is 0.90, and this figure is significantly greater than the corresponding figures for common stock issues and straight public debt offers. The large relative and absolute size of these sample bank loans suggests that bank loans that are announced in the financial press may not be typical. There are two reasonable explanations for this possibility. First, unlike public securities issues, bank loan agreements are required to be publicly disclosed only if they are deemed to be material according to SEC guidelines. Second, even if a firm discloses a new loan agreement in a press release, various financial publications such as the *Wall Street Journal* or the Dow Jones News Service may only report the agreement if the editor believes the announcement is sufficiently newsworthy.[21]

[19] Relevant prior studies which examine the market reaction to financing announcements include Asquith and Mullins (1986), Eckbo (1986), Jung, Kim, and Stulz (1996), Mikkelson and Partch (1986), James (1987), and Lummer and McConnell (1989).

[20] The minimum size public debt issue in our sample is $10 million, a figure which is smaller than approximately 75 percent of our sample bank loan agreements.

[21] This possibility is based on a discussion the authors had with an editor of the *Wall Street Journal.*

Table IVA

Summary Statistics for Common Stock, Bank Loan, and Straight Public Debt Announcements—Clean Announcements Only

The sample consists of all publicly announced bank loans, public straight debt offers, and common stock issues for a sample of 500 publicly traded firms over the 1980 to 1993 time period where the announcement was not contaminated by news concerning earnings, dividends, or control activity. The two-day abnormal return is calculated using the methodology of Mikkelson and Partch (1986) for the two-day period including the day prior to the announcement and the day of the announcement. The amount of the offering includes the size of any lines of credit included in the financing agreement. The 12-month excess return figure equals the cumulative return over 12 months prior to the financing announcement, less the CRSP equally weighted index. The 12-month return figure is the cumulative raw return over the 12 months prior to the financing announcement. Analyst prediction error equals the absolute value of the difference between analysts' composite mean earnings forecast made in the final month of the fiscal year preceding the financing announcement and the actual earnings for the year divided by the composite mean forecast. Stock return volatility equals the standard deviation in common stock returns over the year prior to the announcement. Assets refers to book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. Coverage ratio equals earnings before interest, taxes, and depreciation divided by interest expense. Cash flow is equal to earnings before interest, taxes, and depreciation. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. Bank debt is all debt that is identified as bank debt or private debt where the lender cannot be identified. Short-term notes and term loans are assumed to be bank debt unless a nonbank lender is identified. Total debt is defined to be all short-term debt plus long-term debt less industrial revenue bonds, mortgages, loans from stockholders, and capitalized leases. Public debt includes all public bonds and commercial paper outstanding.

	Common Stock Issues			Bank Loan Announcements			Straight Debt Issues		
	Mean	Median	Number	Mean	Median	Number	Mean	Median	Number
Panel A: Offer Characteristics and Selected Firm Characteristics									
Two-day abnormal return	−2.39%*	−2.54%*	102	1.45%	0.53%	144	−0.23%*	−0.21%*	156
Amount ($ millions)	50*	29*	79	157	50	142	156	122.5*	155
Offer amount/total assets	0.15*	0.11*	78	0.25	0.22	137	0.07*	0.04*	155
Offer amount/market value equity	0.14*	0.10*	79	0.90	0.52	141	0.15*	0.05*	154
12-month excess return prior to issue	56.43%*	34.00%*	101	−12.34%	−20.50%	126	4.91%*	1.01%*	154
12-month return prior to issue	88.64%*	60.41%*	101	3.90%	−6.01%	126	24.61%*	15.10%*	155
Analyst prediction error	0.20*	0.10*	55	2.85	0.246	71	0.21*	0.04*	122
Percent with public debt outstanding	42%		102	51%		144	82%		155
Stock return volatility	2.50%*	2.50%*	102	3.55%	3.03%	144	2.02%*	1.89%*	155
Panel B: Additional Firm Characteristics									
Total assets (1980 $ millions)	911	266	102	1,885	289	149	7,941*	4,512*	156
Age (years)	31*	22*	101	38	31	141	52*	55*	156
Market value of equity ($ millions)	664	231	102	773	93	143	4,250*	2,572*	154
Coverage ratio	9.92*	4.71*	102	2.37	1.50	141	3.76*	3.56*	156
Leverage	0.31*	0.33*	101	0.56	0.50	140	0.46*	0.43*	155
Bank debt/total debt	0.67	0.80	77	0.63	0.69	108	0.55*	0.52*	107
Public debt/total debt	0.10*	0.00*	77	0.21	0.09	108	0.28*	0.21*	107
Cash flow/assets	0.16*	0.16*	101	0.111	0.102	139	0.15*	0.15*	155
Market/book	1.54*	1.43*	102	1.23	1.06	141	1.33*	1.23*	155

* Significantly different from the corresponding figure in the bank loan sample at the 0.05 level.

Table IVB

Summary Statistics for Common Stock, Bank Loan, and Straight Public Debt Announcements—All Announcements

The sample consists of all publicly announced bank loans, public straight debt offers, and common stock issues for a sample of 500 publicly traded firms over the 1980 to 1993 time period. The two-day abnormal return is calculated using the methodology of Mikkelson and Partch (1986) for the two-day period including the day prior to the announcement and the day of the announcement. The amount of the offering includes the size of any lines of credit included in the financing agreement. The 12-month excess return figure equals the cumulative return over 12 months prior to the financing announcement less the CRSP equally weighted index. The 12-month return figure is the cumulative raw return over the 12 months prior to the financing announcement. Analyst prediction error equals the absolute value of the difference between analysts' composite mean earnings forecast made in the final month of the fiscal year preceding the financing announcement and the actual earnings for the year divided by the composite mean forecast error. Volatility equals the standard deviation in common stock returns over the year prior to the announcement. Assets refer to the book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. Coverage ratio equals earnings before interest, taxes, and depreciation divided by interest expense. Cash flow is equal to earnings before interest, taxes, and depreciation. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. Bank debt is all debt that is identified as bank debt or private debt where the lender cannot be identified. Short-term notes and term loans are assumed to be bank debt unless a nonbank lender is identified. Total debt is defined to be all short-term debt plus long-term debt less industrial revenue bonds, mortgages, loans from stockholders, and capitalized leases. Public debt includes all public bonds and commercial paper outstanding.

	Common Stock Issues			Bank Loan Announcements			Straight Debt Issues		
	Mean	Median	Number	Mean	Median	Number	Mean	Median	Number
Panel A: Offer Characteristics and Selected Firm Characteristics									
Two day abnormal return	−2.53%*	−2.54%*	111	0.65%	0.11%	190	−0.27%*	−0.45%*	194
Amount ($ millions)	51*	31*	100	239	50	178	151*	100*	196
Offer amount/total assets	0.142*	0.099*	100	0.30	0.26	175	0.126*	0.047*	185
Offer amount/market value equity	0.146*	0.101*	100	0.97	0.63	175	0.21*	0.087*	185
12-month excess return prior to issue	60.74%*	34.5%*	111	−13.67%	−20.5%	190	9.45%*	2.01%*	194
12-month return prior to issue	93.72%*	63.3%*	111	6.04%	−4.50%	190	30.1%*	21.1%*	194
Analyst prediction error	0.19*	0.10*	63	1.71	0.25	91	0.19*	0.04*	154
Percent with public debt outstanding	42%		111	44%		188	82%		196
Stock return volatility	2.52%*	2.47%*	111	3.60%	3.20%	189	2.14%*	1.98%*	196
Panel B: Additional Firm Characteristics									
Total assets (1980 $ millions)	903*	337*	111	1,341	262	186	6,206*	2,859*	196
Age (years)	31*	23*	111	40	32	188	47*	47*	196
Market value of equity ($ millions)	639	237*	111	629	69.25	189	3,389*	1,684*	196
Coverage ratio	9.86*	4.67*	111	2.63	1.51	186	3.59*	3.85*	196
Leverage	0.32*	0.34*	111	0.55	0.52	186	0.47	0.44	195
Bank debt/total debt	0.67	0.79	83	0.68	0.77	151	0.55*	0.54*	145
Public debt/total debt	0.09*	0.00	83	0.18	0.00	151	0.27*	0.23*	145
Cash flow/assets	0.15	0.16	100	0.10	0.11	151	0.15	0.15	196
Market/book	1.52*	1.41*	111	1.20	1.10	188	1.40*	1.27	196

* Significantly different from the corresponding figure in the bank loan sample at the 0.05 level.

While it is difficult to assess how many bank loan agreements are not publicly announced, indirect evidence suggests a clear bias towards a lack of reporting of smaller loans. In particular, Carey et al. (1998) find that the median loan size in the Loan Pricing Corporation DealScan database for Compustat-listed firms was $25 million during the 1987 to 1993 period. In contrast, the median loan size for our sample bank loan announcements is $50 million.

Additional evidence on the lack of reporting of some bank loans can be inferred from the frequency of bank loan announcements in our sample. The median maturity of our sample bank loan agreements is 33 months. Thus, if all loan agreements and renewals were announced, we would expect a typical firm to make a bank loan announcement approximately every third year. Given our total sample size, this would imply at least 515 announcements in the sample, while, as Table IVB indicates, we actually find only 190 such announcements. In addition, when we examine the relationship between the likelihood of announcing a bank loan and a firm's annual change in total liabilities, there is no statistically significant relationship. In contrast, there is a significant relationship between the likelihood of a public debt announcement and a firm's change in total liabilities.[22]

Taken as a whole, this indirect evidence suggests that it is generally the larger and more newsworthy bank loan announcements that are publicly announced and end up in our sample. As Krasker (1986) and Bayless and Chaplinsky (1991) argue, adverse selection problems are likely to be particularly acute for relatively large offerings. Thus, our sample of relatively large bank loans should tend to include precisely those cases where bank financing was chosen to avoid adverse selection problems in the public securities' markets.

D. Firm Characteristics at the Time of the Financing Announcement

We now turn to univariate comparisons of firm characteristics at the time of the financing announcement. Within sets of firms raising funds, the existing literature (e.g., Lucas and MacDonald (1990)) identifies firms with large stock price run-ups as those who are most likely to be overvalued or fairly valued by the public markets. According to this line of thinking, firms with a smaller price run-up or perhaps even a fall in stock price are likely to be the firms that are most undervalued by the public markets. If bank debt is used to avoid these adverse selection problems associated with public

[22] These results are not reported in the tables. We measure the total change in liabilities as the difference in liabilities between the end of the year the announcement is made and the beginning of that year. One explanation for the weak relationship between bank loans and changes in liabilities is that many bank loans pertain to lines of credit that do not show up on the balance sheet until they are drawn down. In our sample, 63 percent of the loan agreements are lines of credit. This provides a lower bound on the importance of lines of credit, since almost all term loan agreements also include lines of credit (e.g., James and Smith (2000)).

security undervaluation, we would expect our sample bank loan announcements to be preceded by relatively smaller average stock price increases compared to public securities issues.

To investigate, we compute cumulative raw and market-adjusted returns for the 12-month period beginning one year prior to the issue date.[23] As we report in Tables IVA and IVB, the cumulative excess returns preceding the sample financing announcements are consistent with our hypothesis. Common stock issuers exhibit the largest run-up in stock prices preceding their financing announcement. Public debt issuers also experience a run-up, but it is not as large as for common stock issuers.[24] In sharp contrast, bank loan announcements are on average preceded by a negative cumulative excess stock return of −12.34 percent.

The negative average excess return preceding bank loan announcements does not appear to arise because of clustering of bank loan announcements during widespread market increases (i.e., in "up markets"). Notice that the average cumulative market returns prior to the financing announcement are actually significantly smaller for bank loan announcements than they are for the other financing announcements. To further investigate whether the differences we report arise from temporal clustering, we report in Table V the number of financing announcements by type for each year. While common stock issues are more frequent in the early 1980s, the timing of bank loan announcements and straight debt issues appear to be quite similar over time.

An alternative variable that is likely to measure potential security market undervaluation is a firm's stock return volatility. As discussed by Dierkens (1991), firms with a great deal of return volatility are likely to display substantial asymmetric information between insiders and outsiders which can lead to adverse selection problems in the public securities' markets. As the figures in Tables IVA and IVB indicate, bank loan announcements tend to be made by firms with daily stock return volatility significantly larger than public securities' issuers. This is broadly consistent with the notion that undervalued firms find the information benefits of bank debt to be attractive.

As an additional measure of potential market undervaluation, following Best and Zhang (1993) we compute a measure of earnings uncertainty which we refer to as analyst forecast error. We compute this measure by first calculating the absolute value of the difference between analysts' composite mean earnings forecast in the final month of the fiscal year preceding a financing announcement and actual earnings. We then take this figure and divide it by the composite mean forecast. Higher analyst forecast error is assumed to be associated with greater information asymmetries. As we report in Tables IVA and IVB, the mean and median figures for analyst fore-

[23] We compute excess returns by subtracting either the equally weighted index or the value-weighted index from the raw return. The results using either index are very similar.

[24] Our results differ from those reported by Jung et al. (1996), who find negative cumulative excess returns preceding public debt issues.

Table V

Frequency of Type of Financing Announcement by Year

The sample consists of all publicly announced bank loans, public straight debt offers, and common stock issues for a sample of 500 publicly traded firms over the 1980 to 1993 time period as revealed by a search of the Dow Jones News Service. The "Clean Only" column is restricted to announcements that were not contaminated by news concerning earnings, dividends, or control activity.

	Common Stock		Straight Debt		Bank loans	
Year	All	Clean Only	All	Clean Only	All	Clean Only
1980	10	10	14	9	9	7
1981	13	12	6	4	13	10
1982	11	11	14	12	9	5
1983	36	33	10	5	10	7
1984	3	3	10	6	13	4
1985	2	2	19	16	10	10
1986	5	3	22	14	12	11
1987	6	6	20	9	22	17
1988	0	0	10	10	13	11
1989	4	4	11	9	12	8
1990	3	2	10	7	12	11
1991	9	8	16	14	11	9
1992	8	7	21	20	14	14
1993	1	1	13	11	32	20
All years	111	102	196	156	192	144

cast error are significantly greater for the bank loan announcement group than for the public securities issuers. Again, this is consistent with the notion that issuers with more potential for undervaluation arising from a high degree of asymmetric information tend to choose bank debt as their marginal source of funds.

Finally, in Tables IVA and IVB, we report data concerning a variety of other firm characteristics. This data reveals that firms issuing public debt are, on average, larger, older and have less bank debt than firms announcing bank loans. However, in contrast to firms that are bank dependent (see Table II), firms announcing bank loans tend to have more leverage and lower coverage ratios than firms announcing public debt issues. These differences suggest that firms announcing bank loans differ from bank dependent firms (i.e., firms that rely heavily on bank borrowings). Finally, we note here that common stock issuers are on average younger, less highly levered, and have higher market-to-book ratios than the bank loan announcement group.

E. Logit Models of the Security Issue Choice

In this subsection, we present our main results concerning incremental financing choices. Our basic approach is to estimate logit models where the dependent variable takes a value of one if a firm announces a new bank loan

and zero if it chooses an alternative source of finance. In the first set of logit regressions presented in Tables VIA and VIB, we include all financing announcements (i.e., common stock issues, public debt issues, and bank loan announcements). Table VIA includes only clean announcements, and Table VIB includes all announcements. In the second set of regressions presented in Table VII we include only debt financing announcements (i.e., public debt issues and bank loan announcements). Our main interest is on the signs of the coefficients on the variables related to potential security market undervaluation. Following our discussion above, if firms choose bank debt to avoid adverse selection problems, we expect to observe a positive coefficient on stock return volatility and a negative coefficient on stock price run-up.[25] We include a number of other control variables in these regressions based on previous work concerning security issue choice.[26]

As the figures in Panels A of Tables VIA and VIB indicate, the decision to use bank debt is significantly positively related to return volatility and negatively related to the stock price run-up prior to the announcement. In Table VII, where we look at only clean debt issues, the results are similar. Thus, it appears that firms are more likely to choose bank debt over both public debt and common stock when their securities are more likely to be overvalued as measured by our proxy variables. This evidence is consistent with our basic hypothesis about the role of bank financing in incremental financing decisions and is one of our paper's main findings.

It is interesting to compare these logit models predicting bank financing with the corresponding logit models predicting common stock issues. We expect that firms are most likely to use bank debt when information problems are severe and their securities are likely to be undervalued. In contrast, most models of common stock issuance suggest that it is at precisely these times that the likelihood of issuing common stock will be low. In Panels B of Tables VIA and VIB, we report logit results where our dependent variable takes a value of one for common stock offerings and zero otherwise. As expected, in these regressions, the coefficients on the volatility variable and stock price run-up variable are opposite in sign to what we report in the models predicting bank loan announcements.

Note that while the likelihood of bank borrowing is negatively related to the preannouncement run-up in a firm's stock price, there is no significant relationship between the likelihood of a bank loan announcement and the cumulative market return. Thus, bank loan announcements do not appear to

[25] We do not include analyst forecast error in the logit models, as it is missing for a large fraction of the observations. When we did include this variable in the bank loan logit models, it had the correct sign (positive) but was statistically insignificant.

[26] To focus attention on our main findings, we do not discuss the coefficients on these control variables in detail. It is worth noting, however, that the market-to-book ratio could proxy for low (market) leverage or high potential overvaluation. Consistent with these hypotheses, the sign on the market-to-book coefficient is negative in the logit models predicting bank loans. Also note that the significance level on the age coefficient does differ depending on whether or not we restrict our attention to clean issues (compare Table VIA with Table VIB).

Table VIA

Logit Models of Financing Choice—Clean Issues Only

Asymptotic t-statistics are reported in parentheses under the coefficient estimates. The sample consists of all publicly announced bank loans, public straight debt offers, and common stock issues for a sample of 500 publicly traded firms over the 1980 to 1993 time period where the announcement was not contaminated by news concerning earnings, dividends, or control activity. Within this set of announcements, we report below estimates from a logistic regression model where in columns (1), (2), and (3) the dependent variable takes a value of one for bank loan announcements and zero for the other financing announcements. In columns (4), (5), and (6), the dependent variable takes a value of one for common stock issues and zero otherwise. The firm's 12-month return figure is the cumulative raw return on the firm's stock over the 12 months prior to the financing announcement. The 12-month market return is the return on the CRSP equally weighted index. Asset size refers to book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. Stock return volatility is the standard deviation of daily stock returns measured in the year prior to the announcement. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. The bank-dependent dummy variable takes a value of one if the ratio of bank debt to total debt exceeds the sample median of 0.81 and the firm has no public debt outstanding. The public debt dummy variable takes a value of one if the firm has public debt outstanding at the time of the announcement.

	Panel A: Bank Loan Announcements			Panel B: Common Stock Issues		
	(1)	(2)	(3)	(1)	(2)	(3)
Intercept	0.435	0.158	0.412	5.568	5.323	5.112
	(0.377)	(0.130)	(0.354)	(4.212)	(3.851)	(3.784)
Log of asset size (in 1980 dollars)	−0.453	−0.431	−0.441	−0.401	−0.405	−0.457
	(−4.128)	(−3.804)	(−3.828)	(−4.094)	(−3.998)	(−3.829)
Age	0.002	0.003	0.0027	−0.0217	−0.020	−0.021
	(0.627)	(0.601)	(0.465)	(−3.051)	(−3.050)	(−3.026)
Leverage	2.547	2.551	2.534	−3.615	−3.572	−3.559
	(3.624)	(3.606)	(3.533)	(−3.543)	(−3.485)	(−3.427)
Stock return volatility	81.657	80.482	81.344	−80.432	−71.493	−72.49
	(4.016)	(3.904)	(3.954)	(−3.590)	(−3.149)	(−3.208)
Market/book	−0.781	−0.739	−0.748	−0.005	0.036	0.040
	(−2.890)	(−2.237)	(−2.357)	(−0.016)	(0.110)	(0.901)
Bank-dependent dummy variable		0.322			−0.311	
		(1.887)			(−0.825)	
Public debt dummy variable			−0.147			0.131
			(−1.370)			(0.349)
Firm's past 12-month cumulative return	−2.026	−1.929	−1.935	2.158	2.168	2.144
	(−5.040)	(−4.802)	(−4.812)	(5.181)	(5.081)	(5.058)
Past 12-month market return	−0.075	−0.157		0.140	0.142	0.135
	(−1.01)	(−0.212)		(0.195)	(0.195)	(0.852)
N	394	394	394	394	394	394
Pseudo R^2	0.33	0.34	0.34	0.33	0.34	0.34

Table VIB

Logit Models of Financing Choice—All Issues

Asymptotic t-statistics are reported in parentheses under the coefficient estimates. The sample consists of all publicly announced bank loans, public straight debt offers, and common stock issues for a sample of 500 publicly traded firms over the 1980 to 1993 time period. Within this set of announcements, we report below estimates from a logistic regression model where in columns (1), (2), and (3) the dependent variable takes a value of one for bank loan announcements and zero for the other financing announcements. In columns (4), (5), and (6), the dependent variable takes a value of one for common stock issues and zero otherwise. The firm's 12-month return figure is the cumulative raw return on the firm's stock over the 12 months prior to the financing announcement. The 12-month market return is the return on the CRSP equally weighted index. Asset size refers to book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. Stock return volatility is the standard deviation of daily stock returns measured in the year prior to the announcement. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. The bank dependent dummy variable takes a value of one if the ratio of bank debt to total debt exceeds the sample median and the firm has no public debt outstanding. The public debt dummy variable takes a value of one if the firm has public debt outstanding at the time of the announcement.

	Panel A: Bank Loan Announcements			Panel B: Common Stock Issues		
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	1.067	0.501	0.111	3.489	3.306	3.374
	(1.156)	(0.515)	(1.283)	(3.222)	(2.996)	(2.991)
Log of asset size	−0.429	−0.336	−0.352	−0.270	−0.235	−0.275
(in 1980 dollars)	(−5.089)	(−3.743)	(−3.954)	(−3.010)	(−2.410)	(−2.904)
Age	0.008	0.009	0.009	−0.020	−0.0183	−0.019
	(1.828)	(1.993)	(1.930)	(−3.475)	(−3.176)	(−3.210)
Leverage	2.000	2.198	2.167	−4.832	−4.274	−4.541
	(3.844)	(4.009)	(3.848)	(−5.528)	(−4.145)	(−4.970)
Stock return volatility	57.85	69.150	67.947	−44.998	−49.45	−49.043
	(4.044)	(4.407)	(4.330)	(−2.498)	(−2.885)	(−2.864)
Market/book	−0.985	−0.909	−0.907	−0.115	−0.147	−0.159
	(−3.665)	(−3.324)	(−3.358)	(−0.507)	(−0.628)	(−0.682)
Bank-dependent dummy variable			0.851			0.137
			(3.064)			(0.438)
Public debt dummy variable		−0.877			−0.522	
		(−3.150)			(−1.651)	
Firm's past 12-month cumulative return	−1.579	−1.631	−1.605	1.490	1.553	1.581
	(−5.212)	(−5.154)	(−5.124)	(4.826)	(4.805)	(4.889)
Past 12-month market return	−0.015	0.067	0.036	1.616	1.764	1.616
	(−0.025)	(0.101)	(0.055)	(2.214)	(2.302)	(2.154)
N	488	472	472	488	472	472
Pseudo R^2	0.35	0.36	0.36	0.36	0.36	0.36

Table VII

Logit Models of the Choice between Bank Loans and Public Debt—Clean Issues Only

Asymptotic t-statistics are reported in parentheses under the coefficient estimates. The sample consists of all publicly announced bank loans and public straight debt offers for a sample of 500 publicly traded firms over the 1980 to 1993 time period where the announcement was not contaminated by news concerning earnings, dividends, or control activity. The dependent variable takes a value of one for bank loan announcements and zero for public debt offerings. The firm's 12-month return figure is the cumulative raw return on the firm's stock over the 12 months prior to the financing announcement. The 12-month market return is the return on the CRSP equally weighted index. Asset size refers to book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. Stock return volatility is the standard deviation of daily stock returns measured in the year prior to the announcement. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. The public debt dummy variable takes a value of one if the firm has public debt outstanding at the time of the announcement.

	(1)	(2)
Intercept	1.997	1.896
	(1.671)	(1.569)
Log of asset size (in 1980 dollars)	−0.470	−0.425
	(−4.368)	(−3.838)
Age	−0.0002	0.0004
	(−0.045)	(0.067)
Leverage	1.092	1.203
	(1.827)	(1.974)
Stock return volatility	62.528	63.620
	(3.232)	(3.219)
Public debt dummy variable		−0.551
		(−1.530)
Market/book	−0.539	−0.778
	(−2.746)	(−2.499)
Firm's past 12-month cumulative return	−1.204	−1.072
	(−2.981)	(−2.634)
Past 12-month market return	−0.179	−0.243
	(−0.193)	(−0.258)
N	291	290
Pseudo R^2	0.310	0.316

be clustered in "down markets." However, based on the figures in Tables VIA and VIB, it does appear that common stock offerings are clustered in "up markets."

Our basic finding that firms who are likely to be undervalued are more likely to choose bank debt is consistent with our main hypothesis. However, as we outline in the introductory sections, we expect firms to weigh the

information benefits of bank debt finance against the relative contracting costs associated with this choice. For firms where these relative contracting costs are quite high, we expect that it will take a great deal of security market undervaluation to induce the firm to choose bank debt. Thus, we expect these firms to exhibit a relatively low sensitivity of bank loan likelihood to the variables that measure potential undervaluation (e.g., return volatility and stock price run-up). In contrast, for firms where the relative contracting costs of bank debt are low, we expect that it will take little undervaluation to drive these firms to choose bank debt. Consequently, for these firms, the sensitivity of the bank loan choice to the variables measuring potential undervaluation should be quite high.

As a proxy for the relative contracting cost of bank debt, we use the dummy variable *Public*. We expect that firms with public debt outstanding will tend to find the relative contracting costs of bank debt to be quite large, and thus we expect these firms to exhibit a low sensitivity of bank loan choice to the variables measuring potential undervaluation. For firms without public debt outstanding, we expect the relative contracting costs of bank debt will be low, and thus these firms should exhibit a large sensitivity of bank loan likelihood to the undervaluation variables.

In Table VIII, we present logit models where the dependent variable takes a value of one for bank loan announcements and zero for common stock and public debt offerings. In these specifications, we interact the volatility variable and the preannouncement cumulative excess return variable with the public debt dummy variable. As expected, the interaction variables have the expected sign. In particular, volatility has a positive and significant coefficient while volatility interacted with the public debt dummy variable has a negative and significant coefficient. This indicates that the sensitivity of the bank loan choice to stock return volatility is relatively smaller for the firms with public debt outstanding. Similarly, the coefficient on the cumulative excess return prior to the issue is negative and significant, while the interaction with the public debt dummy variable is positive and significant. Since we expect that low cumulative excess returns proxy for undervaluation, this finding again suggests that the bank loan choice is less sensitive to undervaluation problems for firms with public debt outstanding.[27]

Taken as a whole, the results in Tables VI, VII, and VIII are broadly consistent with the adverse selection motivation for using bank debt. In particular, our results suggest that when firms are likely to be undervalued in the public securities markets, they will be particularly likely to choose bank debt as their marginal financing source. In addition, our results suggest that firms weigh these information benefits of debt finance against a wide

[27] In unreported results, we run the logit models in Table VIII for the subset of firms with public debt outstanding. In these specifications, the coefficient on the volatility variable is significantly positive and the coefficient on the excess return variable is significantly negative, indicating that there remains some sensitivity of bank loan choice to these undervaluation variables even for firms with public debt market access.

Table VIII

The Role of Public Debt in the Bank Loan Choice

All coefficient estimates are from the logistic regression model. Asymptotic t-statistics are reported in parentheses under the coefficient estimates. The sample consists of all publicly announced bank loans, public straight debt offers, and public common stock offers for a sample of 500 publicly traded firms over the 1980 to 1993 time period where the announcement was not contaminated by news concerning earnings, dividends, or control activity. The dependent variable takes a value of one for bank loan announcements and zero for public debt and stock offerings. The 12-month excess return figure is the cumulative raw return on the firm's stock over the 12 months prior to the financing announcement less the CRSP equally weighted index return over the same period. Asset size refers to book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. Stock return volatility is the standard deviation of daily stock returns measured in the year prior to the announcement. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. The public debt dummy variable takes a value of one if the firm has public debt outstanding at the time of the announcement.

	(1)	(2)
Intercept	−0.343	−0.543
	(−0.313)	(−0.512)
Log of asset size (in 1980 dollars)	−0.337	−0.290
	(−3.318)	(−2.996)
Age	0.004	0.005
	(0.797)	(0.349)
Leverage	2.001	2.048
	(3.256)	(3.340)
Volatility	134.76	100.365
	(4.009)	(4.824)
Market/book	−0.917	−0.901
	(−2.710)	(−2.897)
Public debt dummy variable	1.621	
	(1.557)	
Firm's past 12-month excess return	−2.900	−2.783
	(−4.621)	(−4.152)
Firm's past 12-month excess return * public debt dummy	1.775	1.734
	(2.153)	(2.219)
Stock return volatility * public debt dummy	−90.65	−36.009
	(−2.363)	(−2.764)
N	394	394
Pseudo R^2	0.35	0.36

range of contracting costs when deciding to choose bank debt. For firms with public debt outstanding, it appears that a great deal of security undervaluation is necessary to induce a firm to cross the threshold where bank debt is optimal, while for firms without public debt, the threshold appears to be lower.

As is typical of most empirical models of security issue choice, the results in Tables VI, VII, and VIII all examine financial choices conditional on a firm making an announcement of new financing. Within this set of firms that raise new funds, the results are consistent with the hypothesis that undervalued firms tend to choose bank debt. However, it is unclear whether firms that announce bank loans are relatively more likely to be undervalued than the typical nonissuing firm. To investigate, in Table IX we present logit models where we include the entire sample of firm-years (both issuers and nonissuers). We include as independent variables most of the control variables that were used in the specification of column one of Table VIA. The results here are broadly consistent with the hypothesis that firms that choose bank debt are more likely to be undervalued than even the typical nonissuing firm. In particular, the coefficient on the volatility variable is significantly positive in these specifications and the coefficient on the stock price run-up variable is significantly negative.[28]

It is interesting to note in Table IX that the likelihood of a bank loan announcement is positively related to both firm size and leverage. These findings contrast with the figures reported in Tables II and III which indicate that firms who are bank dependent are on average smaller and less highly levered than firms that use public debt. One possible explanation for this apparent difference is that larger firms and more highly levered firms may be afforded relatively greater coverage in the financial press.

F. Announcement Day Returns

The results presented above are highly consistent with our basic hypothesis that adverse selection considerations play a role in a firm's decision to use bank debt as a source of incremental finance. To complement these findings, in this subsection, we examine the cross-sectional variation in announcement day returns for our sample bank loan announcements. We expect that these returns should be relatively more positive for firms with more severe asymmetric information problems.

Our basic approach is to regress the two-day abnormal stock return associated with an announcement against a variety of independent variables. We report these results in Table X. In column one, the only independent variable included is a firm's estimated likelihood of choosing bank borrowing estimated from the logit model in column one of Table VIA. This variable should measure the combined effect of many variables related to asymmetric information problems. The estimated coefficient is positive and significant ($t = 3.538$), which is consistent with the hypothesis that firms with more severe asymmetric information problems are attracted to banks because of their ability to alleviate undervaluation problems. In the specification of column two, we add as an independent variable the public debt dummy vari-

[28] For nonissuers, volatility and stock returns are measured over the fiscal year that an announcement was not made.

Table IX

Logit Models of Financing Choices Including Observations with No Announcement

Asymptotic t-statistics are reported in parentheses under the coefficient estimates. The sample consists of all observations for a sample of 500 publicly traded firms over the 1980 to 1993 time period. If a firm makes no financing announcement, the dependent variable is coded as a zero. In columns (1), (2), (3), and (4), the dependent variable takes a value of one for bank loan announcements and zero otherwise. Observations where a firm announces a public debt or stock issue are included in columns (1) and (2), but are excluded from columns (3) and (4). In columns (5) and (6), the dependent variable takes a value of one for common stock issues and zero otherwise. Observations where a firm announces a public debt issue or a bank loan are included in column (5) but excluded from column (6). For firm-years with a financing announcement, the firm's 12-month return figure is the cumulative raw return on the firm's stock over the 12 months prior to the financing announcement. For other observations, this variable is the annual return over the firm-year that no announcement was made. Asset size refers to the firm's book value of assets. Age is years since incorporation. Leverage equals short-term debt plus long-term debt divided by total assets. Stock return volatility is the standard deviation of daily stock returns. The market-to-book ratio (Market/book) is defined to equal (book value of assets − book value of equity + market value of equity) divided by book value of assets as of the start of the observation year. The public debt dummy variable takes a value of one if the firm has public debt outstanding.

	Panel A: Bank Loan Announcements				Panel B: Common Stock Issues	
	All Obs.	All Obs.	Public Issue Obs. Excluded	Public Issue Obs. Excluded	All Obs.	Debt Financing Obs. Excluded
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−4.532	−4.361	−4.762	−4.574	−3.647	−4.011
	(−13.435)	(−12.34)	(−14.064)	(−13.008)	(−7.760)	(−8.271)
Log of asset size (1980 dollars)	0.244	0.243	0.298	0.293	0.136	0.207
	(6.485)	(5.618)	(7.690)	(6.610)	(2.414)	(3.524)
Firm's past 12-month cumulative return	−0.440	−0.393	−0.393	−0.379	0.514	0.496
	(−3.269)	(−2.920)	(−2.968)	(−2.800)	(4.781)	(4.617)
Stock return volatility	20.370	21.24	20.473	21.309	−16.460	−13.391
	(5.965)	(5.917)	(7.690)	(5.897)	(−2.021)	(−1.645)
Age	−0.004	−0.005	−0.005	−0.005	−0.019	−0.019
	(−1.657)	(−2.009)	(−1.908)	(−2.278)	(−4.504)	(−4.015)
Leverage	1.286	1.207	1.273	1.183	0.144	0.212
	(6.448)	(5.889)	(6.369)	(5.760)	(0.541)	(2.786)
Market/book	−0.366	−0.358	−0.323	−0.314	0.207	0.216
	(−2.758)	(−2.683)	(−2.419)	(−2.420)	(2.693)	(2.786)
Public debt dummy variable		−0.100		−0.053		
		(−0.607)		(−0.319)		
Number of observations	3,763	3,763	3,440	3,440	3,763	3,369
Pseudo R^2	0.072	0.078	0.090	0.091	0.056	0.080

Table X

Bank Loan Announcement Returns and Firm Characteristics

The sample includes all bank loan announcements in a sample of 500 publicly traded firms over the 1980 to 1993 time period where the announcement was not contaminated by news concerning earnings, dividends, or control activity. All estimates are ordinary least squares estimates with heteroscedasticity-consistent t-statistics reported under the coefficient estimates. The estimated probability of bank borrowing variable is derived from the logit model in column one of Table VIA. The firm's 12-month return figure is the cumulative raw return on the firm's stock over the 12 months prior to the financing announcement. Stock return volatility equals the standard deviation in common stock returns over the year prior to the announcement. Analyst prediction error equals the absolute value of the difference between analysts' composite mean earnings forecast made in the final month of the fiscal year preceding the financing announcement and the actual earnings for the year divided by the composite mean forecast. Assets refers to book value of assets. The public debt dummy variable takes a value of one if the firm has public debt or commercial paper outstanding. The bond rating of the lender is constructed using a numerical scale as in Billet, Flannery, and Garfinkel (1995). The loan amount includes all lines of credit that are part of the loan agreement. The new loan agreement dummy variable takes a value of one for new loans and zero for renewals.

	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	−0.042 (−1.701)	−0.027 (−1.496)	−0.074 (−6.313)	−0.052 (−2.287)	−0.011 (−0.613)	−0.020 (−1.343)
Estimated probability of bank borrowing	0.113 (3.538)	0.056 (2.434)			0.031 (1.084)	0.0446 (1.820)
Firm's past 12-month cumulative return			−0.005 (−0.527)	−0.022 (−1.228)		
Stock return volatility			2.21 (5.926)	1.406 (2.180)		
Analyst prediction error			0.0005 (1.186)			
Log assets (in 1980 dollars)					0.0052 (0.889)	
Public debt dummy variable		0.023 (1.698)	0.031 (2.906)	0.032 (2.449)	0.009 (0.607)	0.0261 (1.866)
Bond rating of lender					0.013 (0.926)	
Loan amount/firm's market value of equity					−0.10 (−1.098)	0.0109 (1.622)
New loan agreement dummy variable					−0.001 (−0.023)	−0.008 (−0.461)
N	117	116	62	126	56	116
Adjusted R^2	0.04	0.06	0.10	0.15	0.06	0.07

able. This coefficient is positive and significant at the 10 percent level (t = 1.698), suggesting that it takes relatively more security market undervaluation to induce firms with public debt outstanding to choose bank financing.

In columns three and four of Table X, we replace the estimated likelihood of choosing bank financing variable with our proxy variables for asymmetric information. The specification in column three includes analyst forecast error (resulting in a significantly reduced sample size) and column four does not. The main finding in these columns is that stock return volatility and the public debt dummy variable are positive and significant. The positive coefficient on stock return volatility suggests that firms with greater potential for undervaluation in the public markets find banks to be a particularly attractive source of finance. The other variables measuring the potential for undervaluation, stock price run-up, and analyst forecast error are not significant in these specifications. Given the relatively small sample sizes here, the lack of significance on these coefficients may not be surprising.

Finally, in columns five and six of Table X, we include several control variables that have been identified in the prior literature on bank loan announcement returns. In these specifications, we again include the estimated probability of choosing bank financing as a summary measure of information problems. Based on the results of Billett, Flannery, and Garfinkel (1995), the specification in column five includes bond rating of the lender, which significantly reduces the sample size. As the figures in the table indicate, all of the explanatory variables in column five are insignificant. This is likely a reflection of the small sample size and multicollinearity between the explanatory variables. However, similar to our earlier findings, in column six, where we do not include the lender bond rating variable, the estimated coefficient on the bank borrowing likelihood variable and public debt dummy variable are both positive and significant at the 10 percent level ($t = 1.82$ and $t = 1.87$, respectively).

IV. Concluding Remarks

In this paper, we study the incremental financing decisions of a set of 500 firms over the 1980 to 1993 period. Our main hypothesis is that banks have the ability to accurately price financial claims, thus inducing a preference for undervalued firms to choose bank debt as their marginal financing source. We refer to this motivation for using bank debt as the information benefit of bank debt finance. We expect that this information benefit will be weighed against a variety of contracting costs in a firm's ultimate financing choice.

We estimate logit models predicting financing choices and present several pieces of evidence that are consistent with our main hypothesis. In particular, we find that firms who exhibit small preannouncement stock price run-ups and those with high stock return volatility are relatively more likely to announce new bank loans. Since we expect that these firms are the most likely to be undervalued, these findings are consistent with the presence of an information benefit to bank debt finance.

To identify whether firms weigh these information benefits of bank debt finance against other contracting costs, we examine the variation in the sensitivity of the bank loan likelihood to our variables measuring potential

undervaluation. We find that firms with public debt outstanding tend to exhibit a relatively low sensitivity of bank loan likelihood to these variables. Since we expect that the contracting costs of bank debt finance are relatively high for these firms, these results are consistent with the hypothesis that firms weigh the information benefits of bank debt against the contracting costs. In particular, the results suggest that for firms with public debt outstanding, it takes a high degree of undervaluation in the public securities markets for the firm to cross the threshold where the information benefits of bank debt finance outweigh the relative contracting costs.

We supplement our logit findings with an analysis of the cross-sectional variation in the market reaction to our sample bank loan announcements. These regressions are broadly consistent with the hypothesis that the market reaction to bank loans is more positive for firms that are more likely to be undervalued by the public markets. However, the sample sizes here are limited and our ability to draw strong statistical conclusions from this abnormal return evidence is limited.

Taken as a whole, our evidence lends broad support to the notion that banks help alleviate adverse selection problems in the public capital markets. In the language of Myers and Majluf (1984), banks can be viewed as an inside source of "financial slack." Viewing these results in the context of the existing literature, it appears that adverse selection problems explain the incremental financing choice to use bank debt more than they explain a firm's overall use of bank debt at any point in time.

Appendix

In this appendix, we sketch a simple signaling model where banks are assumed to have an ability to resolve adverse selection problems. We incorporate this feature into the model by assuming that banks and managers have the same information regarding a firm's prospects, while outsiders have more limited information. While undervalued firms are naturally attracted to bank finance, they must weigh any information benefits against distortions arising from the bank debt contract.

The signaling model we present focuses on *unobservable* firm characteristics.[29] Our model points out that higher quality firms *relative to the market's assessment* are the ones who may be attracted to bank finance, all else equal, because of the information benefits. These benefits of using bank finance must be weighed against many other costs. Since some firms tend to find bank debt relatively costly, in the event that these firms do access bank finance it will be viewed as a particularly credible signal by the market

[29] The distinction between observable and unobservable characteristics is important and may cause some confusion. In general, there is a common presumption that firms that are of high observable quality should have a tendency to avoid bank finance, as they are the firms least likely to need bank monitoring services (see, e.g., Hoshi et al. (1993)). However, conditional on the characteristics the market observes, firms that are of high unobservable quality may have a tendency to use bank finance to avoid security mispricing.

since the firm is bearing a large cost to overcome adverse selection problems. This observation suggests that firms with access to the public debt markets will tend to elicit larger market reactions to their bank loan announcements, because these are the firms where the market is surprised by the choice of bank debt financing.

We consider a firm that has assets in place that yield a terminal payoff of A_h in the high state or A_l in the low state, where $A_h > A_l > 0$. There are three types of firms: a good-type firm, which has probability p_g of experiencing the high state; a medium-type firm, which has a probability p_m of experiencing the high state; and a bad-type firm, which has a probability p_b of experiencing the high state, where $p_g > p_m > p_b$. The firm must raise I for an investment project that pays R in the high state and 0 in the low state, where R is sufficiently high that all firm types will invest.

We assume that the firm must raise all of its investment funds from either a bank, a public equity issue, or a public debt issue. The firm and the bank know the firm's type, but the public securities markets only know the probability distribution of firm types. There is no discounting, and a public security (bank debt) is sold at its expected value conditional on the public's (the bank's) information. We assume that $A_l < I$, so that a firm that borrows is sure to default in the low state.

We assume that the cost of bank borrowing relative to borrowing in the public markets is lower for some types of firms than for others. For example, issuance costs for public debt may be relatively higher for small firms with a limited track record or firms with valuable growth opportunities. Distress costs or incentive conflicts between shareholders and debtholders may also vary with the type of borrowing and the characteristics of the firm. For example, James (1996) finds that banks rarely make concessions when firms also have public debt outstanding, suggesting the flexibility traditionally associated with bank borrowing may be limited when a firm has public debt outstanding.

A simple way to model these potential differences in transaction costs and agency costs is to assume that in the event that the firm uses bank debt (public debt), the various contracting costs that arise reduce the total cash flows in the low state by an amount $c_b(c_p)$. To illustrate the main points in a simple manner, we assume that these costs from using bank debt are not "too" high. Specifically, we assume throughout that $c_b < [(p_m - p_b)/((1 - p_m)p_b)][I - A_l + c_p]$.

A. Case 1: Bank Debt Is Relatively Inexpensive

We first consider the case where $c_b < c_p$, which we refer to as the case where bank debt is relatively inexpensive. In this case, the contracting costs associated with bank debt are less than they are for public debt. Given that bank debt has the additional advantage that it is fairly priced, it is immediately apparent that the higher quality firms will always prefer bank debt to public debt. Formally, we can state the following result, whose proof follows standard lines and is omitted (proofs available upon request).

PROPOSITION 1: *When bank debt is relatively inexpensive ($c_b < c_p$), there is a unique pure strategy Perfect Bayesian equilibrium outcome in which debt financing is used. In this equilibrium, medium and good firm types use bank debt and the bad firm type issues equity.*

We will refer to the equilibrium identified in the proposition as the Bank Pooling Equilibrium. This equilibrium predicts a positive market reaction to a bank loan announcement. In choosing bank debt, the market infers that the firm is not a bad type, and thus it upgrades its assessment as to the expected value of the firm's assets. However, a bank loan announcement only tells the market that the firm is either a medium type or a good type, so the reaction will not be as large as what would occur if the market learned that the firm was in fact the good type. Note that as a firm's type changes over time (i.e., as insiders realize that their firm is undervalued or overvalued at different points in time), we would expect firms described by this equilibrium to alternate between using equity and using bank debt, while always avoiding the public debt markets. Thus, lack of access to the public debt markets should indicate that a firm's financing decisions are most likely described by the Bank Pooling Equilibrium.

B. Case 2: Bank Debt Is Relatively Expensive

We now consider the case where $c_p < c_b$, which we refer to as the case where bank debt is relatively expensive. In choosing between bank debt and public debt, the higher quality firms must balance the costs associated with bank debt against the benefit that the price of the debt is not subject to asymmetric information. Clearly the good firm type will have the greatest incentive to use bank debt, since this firm type suffers the most from security mispricing. Under some additional assumptions that assure that using bank debt is not too onerous because of contracting costs (condition (A1) below), while public debt is not too onerous because of asymmetric information problems (condition (A2) below), we can establish that there is an equilibrium where only the good firm type uses bank debt, while the medium firm type issues public debt and the bad firm type issues equity. We will refer to this as the Bank Separating Equilibrium. We state this formally in the following proposition, the proof of which is again standard and thus omitted.

PROPOSITION 2: *When bank debt is relatively expensive ($c_b > c_p$), and conditions (A1) and (A2) below hold, the Bank Separating Equilibrium is a Perfect Bayesian equilibrium.*

$$(c_b - c_p) < \left[\frac{(p_g - p_m)}{(1 - p_g)p_m}\right][I - A_l + c_p] \tag{A1}$$

$$c_p > \left[\frac{(p_m - p_b)}{(1 - p_b)p_m}\right][I - A_l + c_p]. \tag{A2}$$

When bank debt is relatively expensive and the Bank Separating Equilibrium obtains, the market learns that the firm is the good type when it announces a bank loan. Because of its high relative contracting cost, using bank debt can be a very credible signal under these circumstances. This analysis predicts that we should expect a larger market reaction following a bank loan announcement in the Bank Separating Equilibrium compared to the Bank Pooling Equilibrium. As a firm's type changes over time, a firm described by the Bank Separating Equilibrium should alternate between all three financing vehicles: equity, public debt, and bank debt. Thus, past access to the public debt markets should indicate that a firm's financing decisions are most likely described by the Bank Separating Equilibrium. Our above analysis suggests that we should observe relatively larger positive market reactions to bank loans announced by these firms.

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