

Banks and Bubbles: How Good are Bankers at
Spotting Winners?

by

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Abstract

This paper examines the bank lending relationships of a large sample of technology and non-technology firms that went public during the 1996 through 2000 period. We use a unique hand collected dataset to examine the characteristics of firms that establish pre-IPO bank lending relationships and whether post-IPO performance is related to the existence and size of pre-IPO banking relationships. We find that the majority of IPO firms have banking relationships before they go public. Firms with banking relationships are older, more profitable – or, in the case of tech firms, have lower losses - and are more likely to have funding from venture capitalists than firms without banking relationships. We also find that banks lent aggressively to technology firms in the sense that current earnings and cash flows were significantly less important in determining banking relationships for technology firms than for non-technology firms. Consistent with the importance of so called “soft information” in lending decisions, we find that, controlling for ex ante observable risk measures, there is a positive and significant relationship between improvements in post-IPO operating performance and the existence and size of pre-IPO banking relationships. Overall, our results indicate that firms with the best current and future prospects establish banking relationships. Our findings provide an explanation as to why investors may interpret lending relationships as a positive signal of firm quality.

Introduction

During the so called internet or tech “bubble” of the late 1990’s and 2000, many early stage technology (“tech”) companies went public with little or no earnings, and yet achieved, at least initially, extraordinary market values.¹ In this paper, we examine the bank lending relationships of 529 tech firms that went public during the 1996 through 2000 time period using hand collected data from the offering prospectuses.² Specifically, we examine the determinants of bank lending to tech IPO firms (in terms of frequency and size of relationships) as well as the relationship between post-IPO operating performance and bank lending before and after the IPO. We also compare the banking relationships of the tech firms to those of a random sample of 142 non-tech firms that went public during the same period.

Our empirical analysis is motivated by the large theoretical literature in banking that focuses on banks and other private lenders as screeners that reduce ex ante information asymmetries (see, for example, Diamond (1991), Fama (1985), and Ramakrishnan and Thakor (1984)).³ We focus on banking relationships among IPO firms for several reasons. First, early stage technology firms provide an ideal laboratory in which to test the screening role of banks. In particular, since the typical firm in our sample is quite young, consists primarily of growth opportunities, has relatively few tangible assets and a limited track-record, bank sorting based on “soft information”- that is, customer specific proprietary information that is not publicly available - is likely to be particularly important.⁴ Indeed, the use of non-public information in granting loans and monitoring is often used to distinguish bank lending from “arm’s length” funding arrangements (see Rajan (1992)).

¹ As discussed in Section 2, we use Loughran and Ritter’s (2004) method for classifying technology and internet firms. We exclude companies with sales of less than \$1 million and firms with offer prices of less than \$5.

² Recent papers by Ljungqvist and Wilhelm (2003) and Loughran and Ritter (2004) examine changes in IPO valuations during the 1990’s and 2000, and describe trends in the characteristics of firms going public during this period. About 50 percent of the firms going public in 1999 and 2000 were in the technology sector. For an analysis of the rise and fall of internet stocks during the late 1990’s and early 2000’s see Ofek and Richardson (2003).

³ See Boot (2000) and Gorton and Winton (2003) for a review of the literature on banking relationships.

⁴ See, for example, Berger and Udell (1995), Berger, Klapper and Udell (2001), and Petersen and Rajan (1994) for a discussion of the importance of soft information in bank lending decisions.

A second reason for focusing on IPO firms is to examine the characteristics of firms that invest in reputation building with banks and/or are selected by banks for relationship building.⁵ Previous empirical studies find that the younger and more informationally opaque firms use relatively more bank debt (see, for example, Houston and James (1996), Johnson (1997) and Sufi (2005)). However, these studies focus on *publicly* traded firms, where virtually all firms have some type of credit facility and information asymmetries are likely to be less important. In particular, while the lack of an established track record and uncertainty concerning investment opportunities should make banking relationships especially important for our sample firms, the lack of collateral and the absence of cash flows may make all but the most established tech firms unattractive to bank lenders.⁶ As a result, when screening potential borrowers, banks may focus on later stage firms that provide more immediate lending opportunities and have the best long term prospects (see, for example, Hellmann, Lindsey and Puri (2004)).

The fact that some early stage companies may not be viewed as bankable raises two additional questions. First, are these firms able to obtain debt financing from other private or public sources? Second, does bank lending substitute or complement the role of other screeners and monitors such as venture capitalists? For example, Ueda (2004) develops a model in which entrepreneurs with less collateral but strong intellectual property rights finance through venture capitalists rather than banks.⁷ In that context, bank financing is a substitute and not a complement to venture financing. Alternatively, practitioners describe the role of VC's as funding providers so as to make the company "bankable" and, thus, view VC's and commercial bankers as "partners".⁸ We address

⁵ Banks and borrowers are likely to associate based on mutual choice in a manner similar to the underwriter issuer association modeled by Fernando et al. (2005).

⁶ Commercial bank lending and regulator examination manuals encourage lenders to base working capital and term loans on operating cash flows, and admonish bankers from lending on the basis of proceeds of future financing or the liquidation of collateral. See, for example, Ruth (1990) and Commercial Bank Examination Manual (2000) section 2080.1. Carey, Post and Sharpe (1998) argue that safety and soundness regulations may lead banks to specialize in lending to the least risky credit applicants.

⁷ In her model, the drawback of VC financing is the greater risk of expropriation of intellectual property.

⁸ Murphy (1997) provides a description, based on interviews with VC's and bankers, of how bankers and VC's view their roles in the financing process. Imperial Bank, the third most frequent lender to the tech firms in our sample, states on its corporate website that "...our experienced lenders work closely with venture capitalists to identify, fund, and nurture innovative technology companies. Our objective is to provide our clients with intelligent, creative financial solutions to maximize their return on equity and reach their ultimate business potential." <http://www.capitalvenue.com/ImperialBank.htm>. Imperial Bank was acquired by Comerica in 2002.

these questions by examining how the existence and size of banking relationships vary with the use of other sources of debt financing and venture financing.

A third reason for studying banking relationships among IPOs is to examine whether the determinants of lending relationships for tech firms differ from the ones for non-tech firms. Anecdotal evidence from industry practitioners suggests that the loans to technology firms require more due diligence and rely more heavily on soft information concerning intellectual property and human resources than loans to non-tech firms.⁹

While bank lending to young private firms is an ideal place to examine the role of banks as screeners, our IPO sample raises a concern that this type of bank lending may be different from bank lending to other privately held firms. In particular, during the hot IPO market of the late 1990's, many companies, especially in the tech sector, went public much earlier than had been historically the case, raising a concern that banks relied principally on the proceeds from anticipated public offerings and not on current or future operating cash flows when making lending decisions. This type of bridge financing could result in a short-term transaction focus unrelated to future operating performance.

Overall we find that, despite having virtually no earnings and few fixed assets, the majority (75%) of tech firms established bank lending relationships prior to their IPO. The relative size and frequency of banking relationships among these firms are similar to those of non-tech IPO firms. Both tech and non-tech firms with banking relationships are older, more profitable (or, in the case of the tech firms, have lower losses), and more likely to use VC financing. In addition, both the frequency and size of banking relationships vary inversely with the amount of borrowing from other sources. Thus, banks appear to avoid lending to firms that rely heavily on borrowing from other sources.

We find that the importance of earnings as a determinant of banking relationships differs between tech and non-tech firms. The mean and median EBITDA to sales ratios are positive for non-tech firms with banking relationships. In contrast, tech firms with banking relationships have substantial losses. Thus, although lending standards appear to be different for technology firms throughout the sample period, this was especially the

⁹ See Murphy (1997) and Carpenter and Petersen (2002).

case during the bubble. Moreover, among banks lending to tech firms, cash flows appear to be least important for small boutique banks.

To investigate the screening role of banks, we examine the relationship between post-IPO operating performance and pre-IPO banking relationships. Specifically, we examine the relationship between post-IPO industry adjusted EBITDA to sales and operating cash flows to sales and pre-IPO banking relationships for a three year period following the IPO. Overall, we find that firms with pre-IPO banking relationships perform much better even after controlling for differences in operating performance and firm characteristics at the time of the IPO. In addition, as discussed later, while firms with banking relationships are more likely to survive than firms without banking relationships, survivor bias does not appear to be significant in our performance analysis sample.

Finally, we analyze the relative importance of the screening versus monitoring roles of banks by examining the relationship between post-IPO operating performance and post-IPO borrowing. If banks screen out firms with the best prospects, we would expect post-IPO operating performance to depend on whether the firm was able to establish a pre-IPO relationship and not on whether the firm continues to borrow after the IPO. That is exactly what we find.

Overall, our results suggest that banks lend to the least speculative and informationally opaque early stage firms. In this regard, the bank lending niche for small start-up firms appears to be different from the niche banks occupy for publicly traded companies (see Houston and James (1996)). In determining which young firms to establish relationships with, banks appear to follow the rule “If you want a relationship, don’t marry a rock star”. While banks lent extensively to tech firms with financial and operating characteristics that banks typically avoid, banks focused on the observably least risky tech firms (the most established of the “rock stars”) with ex post better operating performance. This result is consistent with the view that a bank lending relationship provides the firm’s other claimants a credible signal about the firm’s overall creditworthiness.

The remainder of this paper is organized into four sections. Section 2 provides a description of our data sources and sample. Section 3 examines the relationship between

the existence and size of pre-IPO banking relationships and firm and industry characteristics. In Section 4 we study the relationship between post-IPO performance and pre-and post-IPO banking relationships. Section 5 presents a summary and our conclusions.

II. Sample Selections, Data and Summary Statistics

II.a. Sample Selection

Our sample consists of 529 tech and 142 non-tech firms that went public from 1996 to 2000. We selected the tech and non-tech firms from Jay Ritter's IPO database. This database contains all U.S. IPOs with an issue price of \$5.00 or more. We exclude IPOs involving unit offerings, spinoffs, ADRs, reverse LBOs, closed-end funds, REITs and financial institutions. Because our performance measures are scaled by sales, we also exclude firms with de minimis pre-IPO annual sales less than \$1 million.¹⁰ We identified technology and non-technology firms using the same criteria as Loughran and Ritter (2004).¹¹ From the set of technology firms, we included all firms for which we could obtain post-IPO stock prices and financial information from the CRSP and Compustat databases, and for which we could obtain the IPO offering prospectus and post-IPO 10K electronically from EDGAR. Since our focus is on the role of commercial banks screening and monitoring borrowers, we required the offering prospectus of firms with debt outstanding to describe the lending relationships with enough detail as to determine whether or not a commercial bank was involved. This left us with a total of 529 technology firms. Reflecting the hot tech market of the so called bubble period, 364 of the firms in the technology sample went public in 1999 and 2000. The smallest number of tech IPOs corresponds to 1998, when 78 firms went public.

¹⁰ The omitted firms represent about 8 percent of our original sample.

¹¹ In particular, firms are classified as technology firms if they have the following four digit SIC codes: 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3674 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812, 4813 (telephone equipment), 4899 (communications services), and 7370, 7371, 7372, 7373, 7374, 7375, 7378, 7379 (software). Also included in the technology group are internet firms. Internet-related firms are identified by merging the internet identifications of Thomson Financial Securities Data, Dealogic, and IPOMonitor.com. In addition, because of some obvious omissions, Loughran and Ritter identified some internet IPOs manually. We use their classifications.

For the sample of non-technology firms, we began by randomly selecting 175 IPO firms with information available from Compustat and CRSP for the year after the IPO. The number of firms randomly selected each year was determined so that each year the proportion of non-tech firms in our sample equals the corresponding annual proportion of non-tech firms in Ritter's IPO database. We were able to obtain, using EDGAR, information on bank relationships from the offering prospectus and from a post-IPO 10-K, for 142 of these firms. The non-tech sample is clustered in the 1996 through 1997 pre-bubble time period, with 96 non-tech firms going public during that period.

For each firm, we collected information on pre-IPO banking relationships and accounting information from the offering prospectus. We supplemented this information with pre-IPO financial data (when available) from Compustat. The data concerning the offering, such as price range, number of shares issued, lead underwriter rank, and whether the firm received VC financing, come from Jay Ritter's IPO database. We obtained information on post-IPO bank borrowing for the first full fiscal year following the IPO from the 10K filings.

From the offering prospectus, we collected information on pre-IPO short term and long term debt outstanding, public debt, amount and type of outstanding bank agreements, whether the loans were secured, and the amount of any lines of credit or other credit facilities. In addition, we collected information on the bank lender names and whether the banks held common stock or warrants to purchase shares of stock.

We define bank loans narrowly to be loans from commercial banks or other depository institutions. Debt from other private sources, such as private placements, suppliers and finance companies is classified as other debt.¹² There are two reasons for this classification. First, bank loans are generally considered "special" in the sense that banks obtain information through a deposit relationship (and potentially other sources) that may not be available to other lenders (see, for example, Fama (1985)). Evidence from a number of empirical studies lends support to this view (for example, see James (1987), and Petersen and Rajan (1994)). Second, the source of private debt other than bank debt is

¹² Some of the offering prospectuses indicate that the firm had short and/or long term debt outstanding, but do not provide any detail as to the source of these obligations. Since we could not definitively classify the debt as bank or non-bank, we did not include these firms in our sample.

often not reported in enough detail as to determine whether it was intermediated debt or directly placed debt. As a result, we group all other debt together. Thus, if finance companies and other intermediaries play a role similar to banks, our conservative classification is likely to understate the effect of bank borrowing on performance relative to non-intermediated sources of debt financing.

II.b. Summary Statistics

Table 1 provides summary statistics for our sample firms grouped according to whether or not the firm had a banking relationship prior to its IPO. Panel A provides summary statistics for the tech firms, and Panel B for the non-tech firms. Industry adjusted statistics are computed by subtracting the industry median from the firm level data. We report summary statistics on financial characteristics that have frequently been used in the banking literature as proxies for information problems and the ex ante risk of the borrower (see, for example, Houston and James (1996) and Johnson (1997)).

Focusing first on the tech firms, we find that 75 % of them established bank lending relationships before their IPO.¹³ Firms with banking relationships are on average larger (in terms of assets and sales) and older, use more leverage, and have lower losses. The average amount of non-bank borrowing relative to assets is lower, and the median is similar to the median ratios of firms without a banking relationship.¹⁴ This suggests that the higher leverage of firms with banking relationships comes from their bank borrowing.

If information asymmetries between the firm's owners and potential outside investors contribute to IPO underpricing, as a number of theoretical models of IPO underpricing predict, and if banking relationships serve to credibly reduce valuation uncertainty, then one would expect IPO underpricing to be lower for firms with

¹³ This is a much larger percentage than the one that would be obtained if we relied on DealScan to determine whether a firm had a banking relationship prior to its IPO. Only about one quarter (23%) of the tech firms in our sample had loans reported in DealScan the year before and 2 years after the IPO.

¹⁴ Virtually all the other debt is private debt. Only three tech firms and one non-tech firm had public debt outstanding prior to the IPO. Information on public debt outstanding was collected from the offering prospectuses.

established banking relationships.¹⁵ As shown in Table 1, while we find underpricing (measured as the return from the offer price to the closing price on the first day of trading) to be lower on average for firms with banking relationships, the differences are not statistically significant. One explanation is that, during the late 1990's and 2000, information asymmetries may have been a much less important IPO underpricing factor, particularly among tech and internet firms.¹⁶ For example, Loughran and Ritter (2004) suggest for this period a supply based theory as an alternative to the traditional demand based theories of underpricing. In this context, we find that first day returns are significantly lower for firms with banking relationships only in the 1996 to 1998 period. We examine the relationship between IPO underpricing and banking relationships in more detail in Section III.c.

As shown in Panel B, we find similar differences in the non-tech group between firms with and without banking relationships. In particular, non-tech firms with banking relationships are older and more profitable (on an industry adjusted basis) than non-tech firms without banking relationships.¹⁷ However, in contrast with tech firms, non-tech firms with banking relationships have positive earnings and operating cash flows. Moreover, the mean and median earnings relative to sales for tech firms *with* banking relationships are lower than the mean and median earnings for non-tech firms *without* banking relationships. Moreover, in regard to cash flows and earnings, underwriting standards for lending to tech firms appear to be significantly different from the standards used when lending to non-tech firms. As we discuss later, we find that the differences between bank lending to tech vs. non-tech firms are most pronounced during the bubble period.¹⁸

¹⁵ See, for example, Beatty and Ritter (1986), Benveniste and Spindt (1989) and James and Wier (1990). See Ritter (2003) for a recent review of the literature on IPO underpricing.

¹⁶ As Loughran and Ritter (2004) and Ljungqvist and Wilhelm (2003) point out, it is difficult to imagine that information asymmetries between the various IPO parties were completely responsible for the enormous amount of underpricing that took place during the height of the tech bubble.

¹⁷ Throughout the paper, we focus on EBITDA relative to sales as a performance measure. However, our results are similar if we scale by assets or if we use operating cash flows relative to sales.

¹⁸ Consistent with this finding, Silicon Valley Bank, the leading tech lender in our sample, advertises that its lending criteria differ from those employed by "traditional lenders". For example, Silicon Valley Bank states on its corporate website "... You'll find that traditional bank credit facilities often mandate multiple loan covenants, such as minimum profitability or a minimum level of liquidity. In contrast, our Commercial

One explanation for the apparent difference in underwriting criteria is that bankers place greater weight on collateral or access to VC funding when lending to tech firms. However, the ratio of fixed assets to total assets is similar for tech and non-tech firms with banking relationships, and is not significantly greater than the ratio for firms without banking relationships. As shown in Table 1, tech firms are more likely to have VC backing than non-tech firms. However, within the tech sample, the proportion of firms with VC backing does not vary significantly between the bank and non-bank samples.¹⁹

An alternative explanation for differences in earnings between tech and non-tech firms is that capital expenditures and R&D expenditures are treated differently by the two groups of firms. For example, tech firms may be more likely to expense capital expenditures on product design and development than non-tech firms. In addition, non-tech firms may spend relatively more on new plant, property and equipment and other expenditures that are capitalized rather than expensed. If tech firms expense more and non-tech firms capitalize more, then the cash flows of both types of firms might be very similar despite differences in operating cash flows and EBITDA. While development expenses may differ between tech and non-tech firms, the median capital expenditure relative to assets is similar for tech and non-tech firms in the year before the IPO. Thus, the difference in the median operating cash flows less capital expenditures relative to sales is similar to the difference in operating cash flows relative to sales in Table 1.

III. Determinants of the banking relationships

In this section, we examine whether the size and/or type of bank lending differ for tech and non-tech firms and provide a multivariate analysis of the determinants of banking relationships.

Finance division usually requires one operating covenant, based on a review of your financial forecast.” See <http://www.svb.com/services/commfin.asp>.

¹⁹ Based on banking relationships, we find no significant differences in working capital, accounts receivable or inventory relative to assets.

III.a. Characteristics of lending relationships

We collected information from the offering prospectuses on the amounts of bank loans outstanding, amounts of bank credit facilities, names of bank lenders and whether or not the loans were secured. Unfortunately, the rates charged on loans outstanding or the rates and fees associated with the credit facility are frequently not reported in the prospectus. As a result, we did not collect this information. We also collected information on the amount of post-IPO bank borrowing. This information was collected from the 10Ks for the first full fiscal year following the IPO.

Descriptive statistics concerning the lending relationships for the tech and non-tech firms in our sample are contained in Table 2. Notice that the mean and median size of bank loan commitments relative to assets is not statistically different between tech and non-tech firms. However, the mean and median amounts borrowed relative to total assets are lower for tech firms than for non-tech firms. Moreover, in the case of firms with positive book equity, the amount borrowed and the size of the credit facility relative to net worth (common measures of credit risk) are significantly lower for tech firms. Based on these measures, banks appear to be more cautious in lending to tech firms.

While the proportion of loans that are secured is slightly higher for tech firms, the difference is not statistically significant. Ideally, we would like to have some measure of collateral coverage (the liquidation or market value of the collateral relative to the loan balance) to assess the importance of collateral in the bank's lending decision. Unfortunately, the financial statements of our firms do not contain this information.

Table 2 contains two additional findings of interest. First, notice that following the IPO, bank borrowing size drops substantially relative to the firm's assets. The amount of loans outstanding also declines. This is consistent with the view that, since borrowing firms lack current earnings, banks lend on the basis of IPO expected proceeds (despite regulators admonishing lenders not to engage in this type of bridge financing).²⁰

Second, notice that for 20% of the tech firms banks held some equity, typically in the form of warrants to acquire common stock. The amount of equity held is usually quite

²⁰ Borrowing from all sources declines after the IPO. In particular, total debt relative to assets declines from 29% before the IPO to 11% the year after. The median amount of non-bank debt declines by about 60%.

small but, given the level of underpricing, these positions are potentially quite valuable²¹ For example, the average level of underpricing for the IPO's of these firms is 68%, implying that warrants for 76 thousand shares at an exercise price equal to the average offer price would be worth (if exercised at the close of the first day of trading) about \$725,000 or just over 5 percent of the average loan balance.²²

The findings reported in Tables 1 and 2 suggest that the earnings or cash flow criteria for lending to tech firms differ from the criteria used to extend credit to non-tech firms. To a certain extent, this could arise from banks lending more aggressively during the height of the tech bubble (1999 through 2000). To address this issue we compared the financial characteristics of tech and non-tech firms with banking relationships in both the bubble and pre-bubble periods. Table 3 provides a comparison of the medians (a comparison of means yields similar results). In both the bubble and pre-bubble period the median tech firm with banking relationships is smaller, younger, uses less leverage and is less profitable than the median non-tech firm. More important, while we find little change between the median non-tech firm with banking relationships from the pre-bubble to the bubble period, the median tech firm in the bubble period is younger, has fewer tangible assets and is less profitable than the median tech firm during the pre-bubble period. Thus, banks appear to have lent more aggressively to tech firms during the bubble period.

Overall these results suggest that, for tech firms, operating earnings were less important determinants of bank lending, particularly during the bubble. One potential explanation is that bankers expected a significant improvement in the borrower's future earnings, as examined in section IV.

III.b. Multivariate Analysis of the Determinants of Banking Relationships

To further analyze the determinants of banking relationships and differences between tech and non-tech firms, we estimated a set of Probit and Tobit models

²¹ Banking regulations limit bank holdings to less than 5% of the shares outstanding except in workout situations. See James (1995).

²² The median number of shares outstanding or acquirable with warrants equals 76 thousand shares or less than 2 percent of the shares offered by the firm in its IPO.

examining the relationship between the likelihood or relative size of banking relationships and firm and industry characteristics.

Panel A of Table 4 provides estimates of several Probit models relating the likelihood that a firm has a bank lending relationship to measures of the firm's size, age, fixed assets, EBITDA/Sales, whether it is in the technology sector and if so whether it is classified by Loughran and Ritter (2004) as an internet firm, other private debt outstanding, and whether the firm has VC backing. The dependent variable equals one if the prospectus reports a bank loan outstanding or a bank credit facility (used or not) and equals zero otherwise. Column 1 provides estimates for the entire sample, while Columns 2 and 3 provide estimates based on the tech and non-tech samples.

From the results in Column 1 of Table 4, the likelihood of having a banking relationship increases with the age and sales of the firm. The likelihood of a banking relationship also increases with the firm's earnings. These results are consistent with the univariate findings reported in Tables 1 and 2 and suggest that banks are more likely to lend to the *least* informationally opaque and *most* profitable start-up firms.

Column 1 contains two other interesting findings. First, the likelihood of a banking relationship is significantly related to whether the firm received VC backing. This effect is economically significant as well. Evaluated at the mean values of other explanatory variables, the probability of having a banking relationship increases by 18 percentage points if the firm has VC backing. Thus, bank funding appears to be a complement, rather than a substitute, to VC financing. Second, evaluated at the sample means of the other explanatory variables, the likelihood of a tech firm having a banking relationship is 21 percentage points higher than for non-tech firms. This is consistent with bankers lending more aggressively to tech firms.²³

Columns 2 and 3 present estimates of the Probit for the tech and non-tech samples.²⁴ While the point estimates differ between the two samples, only the coefficient

²³ We also estimated the Probit model including as an explanatory variable the firms' market value to sales ratio immediately after the IPO, information not available at the time the credit decisions were made. Nevertheless, it may help measure growth prospects. However, we find no significant relationship between the likelihood of a banking relationship and the market to sales ratio at the time of the IPO.

²⁴ We also estimated the model for tech firms using broad industry controls, i.e. telecomm, computer hardware, software, internet and other. With the exception of the computer hardware dummy, none of the

estimates for EBITDA/Sales and Other Debt/Assets are significantly different at the 5% level.²⁵ In particular, when increasing EBITDA/Sales by one half, its sample standard deviation increases the probability of banking relationships by 18 percentage points for non-tech firms and only 5 percentage points for tech firms.

To examine whether the factors that affect the likelihood of a banking relationship also affect the size of the relationship, we estimated Tobit models relating the size of the loan or credit facility relative to total assets to the same set of explanatory variables utilized in the Probit Models. The first set of estimates reported in the first 3 columns of Panel B uses the amount borrowed relative to total assets as the dependent variable. As shown, borrowing is positively related to EBITDA/Sales and negatively related to the amount of other borrowing. In addition, tech firms borrow significantly less.

In addition, while the likelihood of having a banking relationship is positively related to VC backing, the amount borrowed is negatively related to VC backing. These findings suggest that while banking relationships and VC backing may be complements, conditional on having a banking relationship VC funding substitutes for bank borrowing. Similar to the findings shown in Panel A, the amount of bank borrowing is significantly less sensitive to both earnings and the amount of other debt financing for tech firms.

We also examine the relationship between the size of the offered credit facility and the characteristics of the borrower. As shown in Columns 4 through 6 of Panel B, the size of the offered credit facility is significantly related to the relative amount of fixed assets and earnings. Taken together with the findings reported in Panel A, these findings reported in Panel B indicate that banks establish relationships with the highest quality firms and offer to lend more to the least risky firms within this group.

How do these findings compare to those of previous studies? Empirical evidence on the determinants of banking relationships among private firms using U.S. data is limited. Notable exceptions are Petersen and Rajan (1994) and Berger and Udell (1995), which use data from the Small Business Administration's (SBA) National Survey of

industry dummies are statistically significant. The estimate coefficients reported in Table 3 are similar to the ones we obtain when industry controls are included in the model.

²⁵ We test for a difference by creating a set of tech interaction variables (the tech dummy multiplied by each explanatory variable) and then estimating the model including these interactive variables over the combined sample.

Small Business Finance. They also find that larger and older firms are more likely to have banking relationships.

To our knowledge, this is the first study to examine the determinants of banking relationships among small privately held firms using detailed information on firm level operating performance. Most prior work on the determinants of bank borrowing using operating performance measures focuses on the mix of public versus private debt. These studies find that younger firms and firms with greater growth opportunities rely more heavily on bank or other intermediated debt (see, for example, Houston and James (1996) and Johnson (1997) and Cantillo and Wright (2000)). These studies are not directly comparable to ours since they are based on samples of publicly traded firms, many of which have access to public debt markets, and they generally do not distinguish between the various types of private debt claims.

Our findings are consistent with those of Cary, Post and Sharpe (1998). Cary et al. study the choice between bank borrowing and loans from financing companies, and find that banks specialize in lending to firms with higher earnings and less leverage than the average finance company borrower. While we find that banks lend to firms with higher average earnings, bank borrowers in our sample are also more levered. In a recent study, Sufi (2005) finds that, among firms that use debt, reliance on bank borrowing is increasing in past earnings. In addition, he finds that the relationship between bank borrowing and earnings is strongest among most information problematic borrowers (as proxied by the market to book ratio).²⁶ To the extent that information asymmetries are greatest for tech firms, our results suggest that the relationship between bank borrowing and earnings is weakest for the most information problematic borrowers.

III.c. A Closer Look at Underpricing and Banking Relationships

Prior studies of the relationship between IPO underpricing and banking relationships address two general issues. The first issue concerns whether banking relationships serve to reduce information asymmetries that contribute to IPO

²⁶ While we also find that earnings are an important determinant of bank lending relationships, lending to tech firms (who arguably have, as a group, the greatest growth options) is the least sensitive to cash flows.

underpricing. Consistent with this banking relationships reducing information asymmetries, James and Wier (1990) and Barry and Mihov (2005) find that underpricing is lower for firms that borrow privately before they go public. A second but related issue concerns whether a lending relationship with banks that can underwrite the IPO reduces information asymmetries further. Consistent with this view, Schenone (2004) finds that firms that have lending relationships with banks that can underwrite the firm's IPO are less underpriced.

Given our finding that firms with banking relationships are more established and profitable than firms without banking ties, one would expect that information asymmetries would be lower for these firms resulting in less underpricing. However, based on the univariate statistics reported in Table 1, we find that underpricing is related to whether a firm has a banking relationship only during the 1996 to 1998 period.

One reason our results may be different is the unusually high levels of IPO underpricing during our sample period that, arguably, were unrelated to information asymmetries between the various players in the IPO market. Moreover, neither James and Wier (1990) nor Barry and Mihov (2005) have information on the identity of the lenders and, thus, are unable to address whether what affects underpricing is the amount of private borrowing or the identity of the lender. Second, the univariate analysis does not control for financial and offer characteristics.

We examine whether first day IPO returns are related to the amount of bank borrowing controlling for firm and offer characteristics used in previous studies. The regression results are reported in Table 5. Consistent with the findings of Barry and Mihov (2005), first day IPO returns are negatively and significantly related to leverage. More important, as shown in column 2, both the amount of bank borrowing and the amount of other private borrowing are negatively related to first day IPO returns, and not significantly different from one another at the 10% level. In terms of reducing valuation uncertainty and IPO underpricing, we find no evidence that bank borrowing is special.

III.d. The Identity of the Tech Lenders and Firm Characteristics

Who lends to tech firms? A number of recent papers argue that small banks have a comparative advantage in developing lending relationships that require extensive use of “soft information” (see for example Berger and Udell (1995), and Berger, Klapper and Udell (2001)). The term “soft information” refers to information that is difficult to quantify and transfer, such as information about the character of the borrower or information gathered through contacts with customers, competitors and suppliers. Berger et al. (2005) argue that, in small banks, the authority to allocate capital is co-located with lending expertise, creating better incentives to generate and use soft information.

To investigate this issue, we collected the names of the bank lenders from the offering prospectuses. Unfortunately, only about one half (49%) of the prospectuses identify the names of the lenders. With the names, we obtained information from the FDIC Consolidated Report of Condition (Call reports) and the Federal Reserve’s Y-9 Reports on the asset size of the bank or, in the case of a multi-bank holding company, the size of the holding company. We then computed each bank’s inflation adjusted asset size (assets were adjusted to constant year 2000 values based on the CPI) at the end of the year the borrower went public. We define a “boutique” bank as a bank or bank holding company with less than \$10 billion in assets to include in the boutique category well known specialized tech lenders such as Silicon Valley Bank (just under \$4 billion in assets as of 2000) and Imperial Bank (\$7 billion as of year end 2000). Where multiple lenders are listed in the prospectus, we used the name of the lender listed first.

As shown in Table 6, fifty four percent of the tech lenders in our sample are “boutique” banks, with Silicon Valley Bank lending to 64% of the boutique sample firms. The second most active lender is Imperial Bank, with 20% of the boutique sample. In contrast, the shares of non-boutique lenders are less concentrated. Overall, boutique bank borrowers have significantly lower earnings, and not surprisingly, the amount borrowed and the loan commitment size relative to assets are also significantly smaller. In fact, boutique borrowers have earnings that are similar to the earnings of firms without banking relationships, as shown in Table 1.²⁷ Also, the proportion of borrowers providing

²⁷ We cannot reject the hypotheses that the median operating cash flows and EBITDA to sales ratios for boutique bank borrowers are equal to the medians for firms without banking relationships.

the bank with an equity stake is significantly higher for the boutique bank sample.²⁸ Another characteristic of boutique bank borrowers is that VC funding appears to be a requirement for bank borrowing and not a substitute as Ueda (2004) suggests.²⁹ Moreover, note that during our sample period the boutique banks did not underwrite IPOs, and thus, greater IPO underpricing for their borrowers is consistent with Schenone (2004).

Finally, although the proportion of firms borrowing from boutique lenders increased from 45% to 60% during the bubble period, we find both before and during the bubble statistically significant differences between the two groups of borrowers in terms of size, age and earnings similar to those reported in Table 6.³⁰ Overall, the differences in borrower characteristics shown in Table 6 are consistent with boutique lenders relying more heavily on soft information when establishing lending relationships.

IV. Banking Relationships and Post-IPO Operating Performance

If banks play a role in identifying firms with the best future prospects, we would expect that, controlling for differences in pre-IPO operating performance, the post-IPO operating performance of firms with banking relationships would be better. Alternatively, if banks take a transaction focus when lending to start-up firms before they go public, we would expect no relationship between pre-IPO borrowing and post-IPO operating performance.

²⁸ The largest source of non-interest income for Silicon Valley Bank in 2000 was income from the disposition of warrants (\$96 million). This fell to less than \$1.6 million in 2002. *SVB Financial Group Form 10-k 2002*. Warrant income was also the largest source of non-interest income in 2000 for our second and third largest boutique lenders (Imperial bank and Greater Bay Bancorp). In addition to the univariate analysis, we also estimated a probit model relating the likelihood of a lending relationship with a boutique lender to age, EBITDA/Sales, tangible assets, the proportion of non-bank debt, and VC backing versus other debt. Only the earnings and VC variables are statistically significant (the coefficient estimate on earnings is negative and the coefficient estimate for the VC variable is positive).

²⁹ In its 10K Silicon Valley Bank states: “Our strategy has focused on providing banking products and services to start-up and emerging growth companies receiving financial support from sophisticated investors including venture capital, “angel” and corporate investors. In some cases, our lending decisions are based on our analysis of the likelihood that our venture capital or “angel” backed client will receive a second or third round of equity infusion from investors.” *SVB Financial Group Form 10-k March 16, 2001 page 16*.

³⁰ For example, during the “bubble” period, the median EBITDA to sales ratio for boutique borrowers declined to -88.50% from .58% during the 1996-1998 time period, while the median for large bank borrowers declined to -14.8% from 6.3 %.

To examine these questions we use two measures of post-IPO operating performance: EBITDA/Sales and Operating Cash Flows/Sales.³¹ We scale by sales rather than assets because post-IPO assets will be related to the size of the IPO, causing performance measures based on assets to potentially decline immediately following the IPO. However, our findings are not sensitive to whether we scale by sales or assets.

We focus on EBITDA and operating cash flows because these performance measures are most closely linked to the ability of the borrower to service both current and future bank borrowings. While stock returns and net income are also important measures of performance, they are more removed from the banker's principal focus.

For each firm in our sample, we obtain data on operating performance from Compustat for up to three fiscal years following the IPO. We examine unadjusted, industry-adjusted, and peer firm-adjusted operating performance measures. To limit the effect of outliers we focus on medians. For the industry-adjusted performance measure, we employ the method used by Andrade and Kaplan (1998) and subtract from each firm's level observation the industry median. We define industries by 4-digit SIC codes. If there are fewer than 4 firms in the industry, we use 3-digit SIC codes.

While industry adjustments control for industry wide changes in performance, they don't account for initial differences in performance. To address this issue, prior studies of long term operating and stock return performance typically select an industry peer firm similar in terms of industry and performance. For example, in Loughran and Ritter's (1997) study of seasoned equity offerings (SEO), peer firms were firms in the same industry with similar financial performance that had not undertaken a SEO. The problem with this approach is that the performance of tech IPO firms (both in the bank and non-bank sample) is too poor to find many matching firms. For example, if we follow the Barber and Lyon (1996) procedure and require that the matching firm be in the same industry (based on 2 digit SIC codes) and have EBITDA/Sales within 10% of the IPO firm's performance at the time of the IPO (excluding firms that conducted an IPO in the

³¹ These measures are used in previous studies of operating performance following securities issues. For example, see Jain and Kini (1994), Loughran and Ritter (1997), Teoh, Welch and Wong (1998) and Mikkelsen, Partch and Shah (1997).

prior 12 months), we can only find a match for about a third of the tech firms. Also, if we broaden the performance screen, the matching firms have much better performance.

IV.a. Univariate Analysis

Summary statistics of post-IPO industry adjusted operating performance grouped by whether the firms had a pre-IPO banking relationship are presented in Table 7. Panels A and B present summary statistics for tech firms and panels C and D do the same for the non-tech sample. Following the common practice, we report the medians, although the means follow similar patterns. Year 0 refers to the fiscal year before the IPO, and Year 1 through Year 3 refer to the fiscal years ending after the IPO. Note that Year 1 contains some pre-IPO performance information.

Looking at the tech sample, the EBITDA/Sales medians are significantly greater for firms with banking relationships for all three years following the IPO. In particular, notice that the improvement in the operating performance of tech firms with banking relations results from improvements in performance at the firm level, and not simply due to improving industry conditions. Figure 1 illustrates how differences in industry-adjusted performance as measured by EBITDA/Sales and Operating Cash Flow/Sales change over time. Notice that firms without banking relationships perform more poorly following the IPO, and that the difference in performance increases in year 1.

The post-IPO performance measures for the non-tech firms are shown in Panel C. Unlike the tech sample, we find that the median industry-adjusted performance of firms with banking relationships is similar to the performance of firms without banking relationships at the time of the IPO.³²

The better performance of firms with banking relationships suggests that these firms are more likely to survive. To examine this issue, we obtained the delisting codes

³² One explanation for the better performance of firms with banking relationships is that they are more highly levered. We address this concern using a univariate test as well as a regression analysis. In the univariate analysis, we ranked the firms in the tech and non-tech samples according to their pre-IPO amount of other debt relative to assets. We then computed the median performance measure for each quartile. We find that the median post-IPO performance of firms in the lowest “other debt” ranked quartile is significantly lower than in the other quartiles. However, we find no differences across the other three quartiles.

for the firms that leave our sample in the three years following their IPO. We classified firms as failing if they were delisted due to bankruptcy, liquidation or failing to meet listing requirements during the three years following the IPO. Firms not classified as failing are classified as survivors. Survivors include firms that continue to trade as well as firms that were acquired. We then estimated a probit model relating the probability of survival to pre-IPO characteristics including firm age, EBITDA to sales, sales, other debt to total assets, the ratio of tangible to total assets, existence and size of pre-IPO banking relationships and whether the firm was a technology firm. We find that the likelihood of survival is positively related to firm age, pre-IPO sales and whether the firm was a technology company. We also find a positive and significant relationship (at the .05 level or better) between the likelihood of survival and both the existence as well as size of the firms' pre-IPO banking relationship. Moreover, we find a negative significant relationship between the likelihood of survival and pre-IPO leverage. Surprisingly, given the downturn in the tech sector, we find that tech firms are significantly more likely to survive than non-tech firms. Overall these results are consistent with the hypothesis that, controlling for ex ante risk characteristics, bank lending relationships are informative of future operating performance.

The fact that firms with banking relationships are more likely to survive raises the question of whether the better post-IPO performance of firms with banking relationships is simply due to a greater likelihood of survival. We address this question in two ways. First, in the univariate analysis, we examine a fixed panel of firms with performance histories of at least three years following the IPO. Second, in the multivariate analysis discussed in the next section, we use a Heckman procedure to control for sample selection bias.

Turning first to the univariate analysis, the results using a fixed sample of firms are reported in panels B and D of Table 7. As shown, using the fixed panel we find that firms with banking relationships perform significantly better than firms without banking relationships during the 2000-2003 period. Since the performance differences are similar whether we compare surviving firms or include firms that do not survive, the better performance of firms with banking relationships does not appear to result solely from a higher likelihood of survival.

While these results are consistent with banks establishing relationships with firms that have the best long term prospects, this may result simply because they have better pre-IPO performance.³³ We address this concern in two ways. First, as discussed above, we use Barber-Lyon industry and performance peer firm adjustments. Second, we estimate a regression model relating post-IPO operating performance to financial characteristics at the time of the offering.

Figure 2 shows cumulative growth of EBITDA/Sales using Barber Lyon peer-adjustments. Peer-adjusted performance is computed by subtracting the performance of a matching firm in the same four, three or two digit SIC code with operating performance in between 90% and 110% of the IPO firm at fiscal year end prior to the IPO. Cumulative growth is measured as the difference between peer adjusted performance for the year of the IPO and the peer adjusted performance for the year prior to the IPO. If the matching firm is delisted or financial information is not available, we replace it with the next closest matching firm. As Figure 2 shows, the performance of firms with banking relationships improves relative to their industry peers, while the performance of firms without banking relationships deteriorates.³⁴ We also find that the cumulative growth in performance of non-tech firms with banking relationships improves relative to their performance-matched industry peers, while the performance of their counterparts without bank lending deteriorates.

IV.b. Multivariate Analysis of Post-IPO Performance

One explanation for why firms with pre-IPO banking relationships perform better after they go public is that there is persistence in performance. Alternatively, better

³³ Another possibility is that the owners of firms with banking relationships retain a greater ownership interest in the firm after the IPO. In particular, Jain and Kini (1994) find that post-IPO operating performance is positively related to the share of the firm retained by the pre-IPO owners. If insiders retain more shares because they have access to bank financing (because, for example, firms with banking relationships are less dependent on equity financing), then differences in ownership structure may be the reason why firms with banking relationships do better. However, we find no differences between the bank and non-bank samples regarding the proportion of ownership retained by pre-IPO shareholders. Specifically, the percent of primary shares offered in the IPO is not significantly different between the bank and the non-bank samples, and dilution measured as primary shares offered relative to total post-IPO shares outstanding averages 24% for both groups.

³⁴ The results are similar if we relax the performance matching requirement and use as a peer the firm in the 2 digit industry classification with performance closest to the IPO firm.

performance could be explained by *ex ante publicly observable* risk differences that are correlated with whether or not a firm establishes a banking relationship. Assuming we have a reasonably complete list of *ex ante* publicly observable risk measures, we can test then the importance of the bankers' soft private information.

Another explanation for the relationship between post-IPO performance and banking relationships is that firms with pre-IPO relationships are more likely to continue borrowing or having access to bank credit.³⁵ As a result, while bank screening may be important, the benefits of bank monitoring or lower external financing constraints may also contribute to better performance.³⁶ However, finding no relationship with post-IPO borrowing is inconsistent with the argument that ongoing monitoring associated with continued borrowing is the reason for better performance.

We estimate several regression models relating post-IPO performance to pre-IPO banking relationships, firm and financial characteristics. The results are reported in Table 8. The dependent variable is the firm's post-IPO industry-adjusted EBITDA/Sales. The relationships are essentially the same if we use cash flow to sales as the performance measure or peer firm adjusted measures. Since the results do not vary with the post-IPO time period, we report the regression results using performance data for the first and third years following the IPO.³⁷

Finally, to investigate potential sample selection bias arising from the fact that firms with a banking relationship may be less risky and thus more likely to survive, we correct for sample selectivity using a two step Heckman procedure (see Green (1993) for a description of this technique). The first step in this procedure involves estimating the likelihood of survival (i.e. not failing). We use the probit model described earlier (excluding the technology variable) to estimate the likelihood of survival. Using the

³⁵ Firms with banking relationships may be less credit constrained and utilize less high cost trade credit (as Petersen and Rajan (1994) find). In addition, ongoing bank monitoring may reduce agency costs and bank lenders may be more flexible than arm's length lenders, thus resulting in lower financial distress costs (see, for example, Berlin and Loeys (1988) or Gilson, John and Lang (1990)).

³⁶ It is important to note that even if, as we find, what matters is having pre-IPO relationships and not post-IPO borrowing, this does not imply that bankers add value *only* through screening. For example, while a firm may not continue to borrow after the IPO, it may still have access to liquidity through lines of credit, storing less liquidity on its balance sheet (which may, in turn, lead to better performance).

³⁷ We also estimated the regression for tech firms with broad industry controls (e.g. computer hardware, software, etc.). The results are similar to those in Table 8.

probit estimates we compute an inverse Mills ratio and include it as explanatory variable in the regression models. A simple test of selection bias involves evaluating the significance of the coefficient estimate of the inverse Mills ratio (λ). The estimate of λ is not statistically significant in any of the regressions (the largest absolute value of the t statistic is 1.31). As a result, we estimate the performance regressions using OLS techniques.

Overall, as shown in Table 8, we find a positive and statistically significant relationship between post-IPO operating performance and industry-adjusted earnings prior to the IPO. Age is also related to post-IPO performance, with older firms doing better than younger firms. Most interesting is the positive relationship between post-IPO operating performance and the size of pre-IPO banking relationships (we obtain similar results for the 1996-1998 and 1999-2000 periods and for the existence of a banking relationship).

Our findings with regard to operating performance are different from those based on long term stock returns. For example, Brav and Gompers (1997) find that VC backed firms outperform non-VC backed firms using equally weighted portfolios. Barry and Mihov (2005) also find that VC backed firms have higher long run returns than non-VC backed firms after controlling for the amount of debt financing. It is unclear whether the reason is the use of operating performance and not stock returns and/or the focus on tech IPOs in the late 1990's and 2000 time period.³⁸

An obvious danger of including post-IPO borrowing in the regression model is that post-IPO borrowing is likely to be endogenous. Given this caveat, we include a dummy variable, *Retain*, that equals one if the first post-IPO 10-K indicates that the firm continued to borrow under its bank credit facilities.³⁹ However, as shown in columns 3-4 and 7-8 of Table 8, we find no significant relationship between post-IPO performance and

³⁸ In particular, the relationship between VC backing and long term performance may have changed during the 1990s because of more frequent "grandstanding" among VC's. For a discussion of incentive conflicts that give rise to grandstanding, see Gompers (1996). Consistent with this argument, Lee and Wahal (2004) find that VC backed IPOs experience larger first day returns than non-venture backed IPOs, especially during the bubble period.

³⁹ A few firms without pre-IPO banking relationships established banking relationships subsequent to the IPO. We cannot reject the hypothesis that the median post-IPO performance of these firms is different from the post-IPO performance of firms with pre-IPO banking relationships.

whether or not the firm continues to borrow from its banks. We also estimated the model including the size of the post-IPO banking relationship relative to assets with similar findings. These results are consistent with the argument that better post-IPO performance of firms with a banking relationship arises from having the best ex ante prospects, and not from banks controlling ex post agency problems through monitoring.

The only other study we are aware of that examines the relationship between long run performance and bank borrowing is Billett, Flannery and Garfinkel (2006). However, they examine the relationship between performance and the *announcement* of bank loan agreements.⁴⁰ Moreover, since our findings and those of Sufi (2005) indicate that most publicly traded firms have banking lending relationships, underperformance may be associated with the expansion of existing lending relationships or the public announcement of a new loan and not with the existence of a prior lending relationship.

V. Summary and Conclusions

An important strand of the banking literature holds that bank relationships are special in that, through an ongoing relationship with a borrowing customer, bankers gain access to information that is not available to the other firm claimants. This information is generally soft in nature and is used in conjunction with current financial and other hard data when making credit decisions. Soft information is generally thought to be most important in lending to small and young private firms because these firms lack a long track record and may not report financial information in a consistent fashion. For these firms, banking relationships are expected to be particularly informative about the borrowing firm's future prospects.

In this paper we analyze this issue by examining the banking relationships of a large sample of IPO firms and, in particular, how banking relationships are related to the post-IPO operating performance. We find that, based on ex ante observable risk measures, firms with banking relationships are the least risky IPO firms. Moreover, firms with banking relationships are more likely to have venture capital backing, suggesting that

⁴⁰ Their analysis is based on a set of firms that publicly announce loan agreements as well as firms with loan agreements reported in Dealscan.

bank funding and venture financing complement one another. Overall, despite their apparent cautious nature, bankers seemed to lend aggressively to technology firms during the bubble.

Firms with banking relationships are not only the best performing firms before the IPO, they also continue to operationally outperform firms without banking relationships for three years after the IPO. Indeed, while the performance of firms without banking relationships initially deteriorates following the IPO, and then improves, the performance of firms with banking relationships improves even in the year following the IPO. More important, controlling for pre-IPO performance, we find that post-IPO operating performance is significantly related to whether or not the firm had a banking relationship prior to the IPO. Thus, banking relationships appear to be informative of future operating performance.

Overall, our findings provide insights into why a firm's outside claimholders might view banking relationships as a positive signal concerning the firm's prospects. In particular, if based on observables or hard information, banks establish relationships with the ex ante least risky firms, and if ex post those firms do better than firms without banking ties, it might reasonably be concluded that the unobservable soft information on which the loan was based is favorable. This may explain why previous empirical studies find a positive stock price reaction to bank loan announcements.⁴¹

⁴¹ See for example, James (1987) and Billett, Flannery and Garfinkel (1995).

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Figure 1

Difference in the Median Industry-Adjusted Performance of Bank Versus Non-Bank Technology Firms

The sample consists of 529 technology firms and 142 randomly selected non-technology firms that went public from January 1996 to December 2000. We categorize technology firms using the criteria described in Loughran and Ritter (2004). Firms are classified as having a banking relationship if the offering prospectus indicates that the firm has either a bank loan outstanding or a bank credit facility. Data on pre-IPO operating performance is from the offering prospectus, and information on post-IPO operating performance is from Compustat. Year refers to the number of years following the IPO. Year zero refers to the last fiscal year prior to the IPO. Industry adjusted performance is measured by subtracting the industry median from the firm's performance measure level. Industry is defined by the four digit SIC codes or if fewer than 4 firms are available by three digit SIC code.

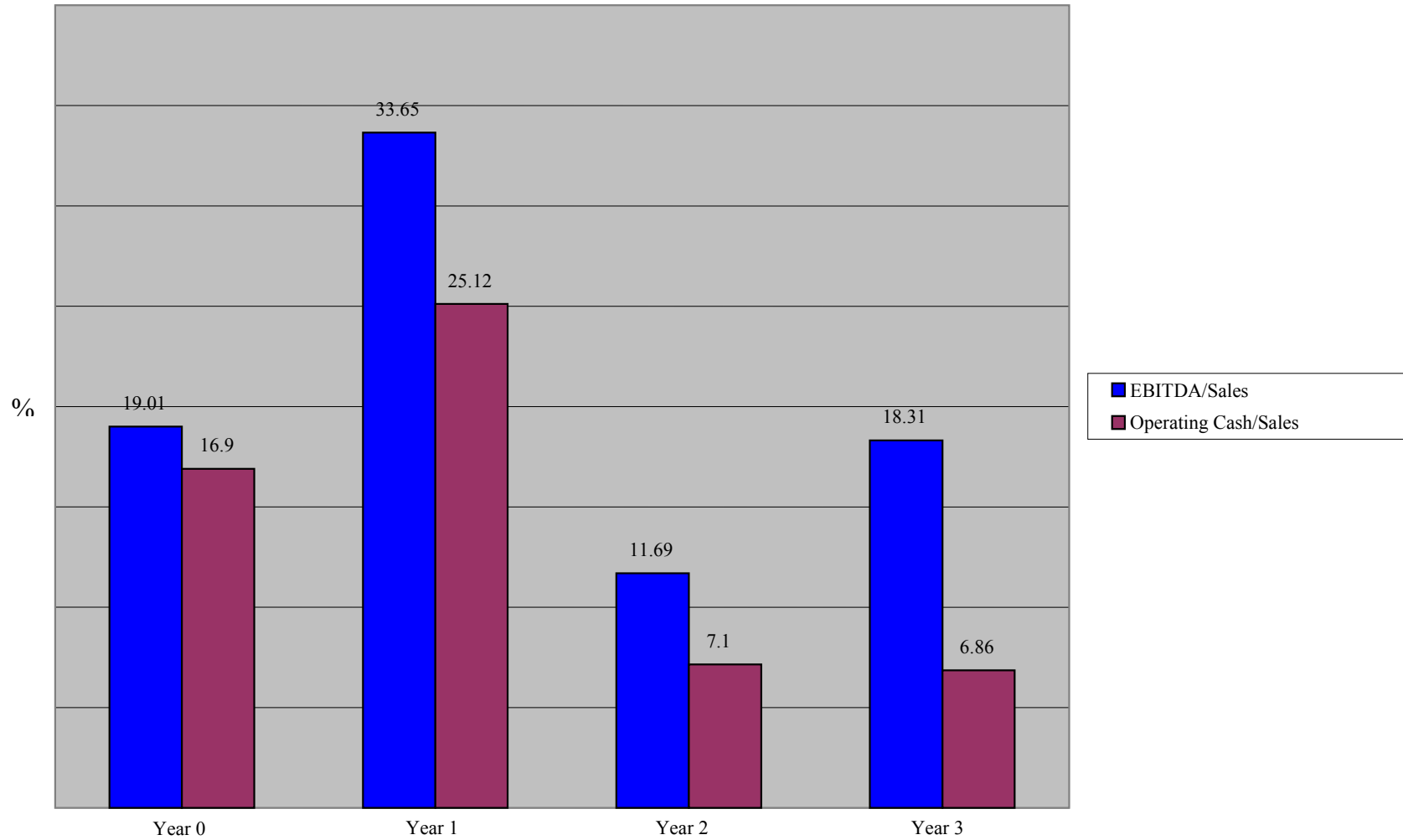


Figure 2

Difference in Median Barber-Lyon Peer-Adjusted Cumulative Growth in EBITDA/Sales of Bank and Non-Bank Technology Firms

The sample consists of 529 technology firms and 142 randomly selected non-technology firms that went public from January 1996 to December 2000. We categorize technology firms using the criteria described in Loughran and Ritter (2004). Firms are classified as having a banking relationship if the offering prospectus indicates that the firm has either a bank loan outstanding or a bank credit facility. Data on pre-IPO operating performance is from the offering prospectus and information on post-IPO operating performance is from Compustat. Year refers to the number of years following the IPO. Year one refers to the first fiscal year after the IPO. Peer adjusted performance is computed by subtracting the performance of the firm in the same four, three or two digit SIC code with operating performance in between 90% and 110% of the IPO firm at fiscal year end prior to the IPO. Cumulative growth is measured as the difference between peer-adjusted performance for the year and the peer-adjusted performance prior to the IPO.

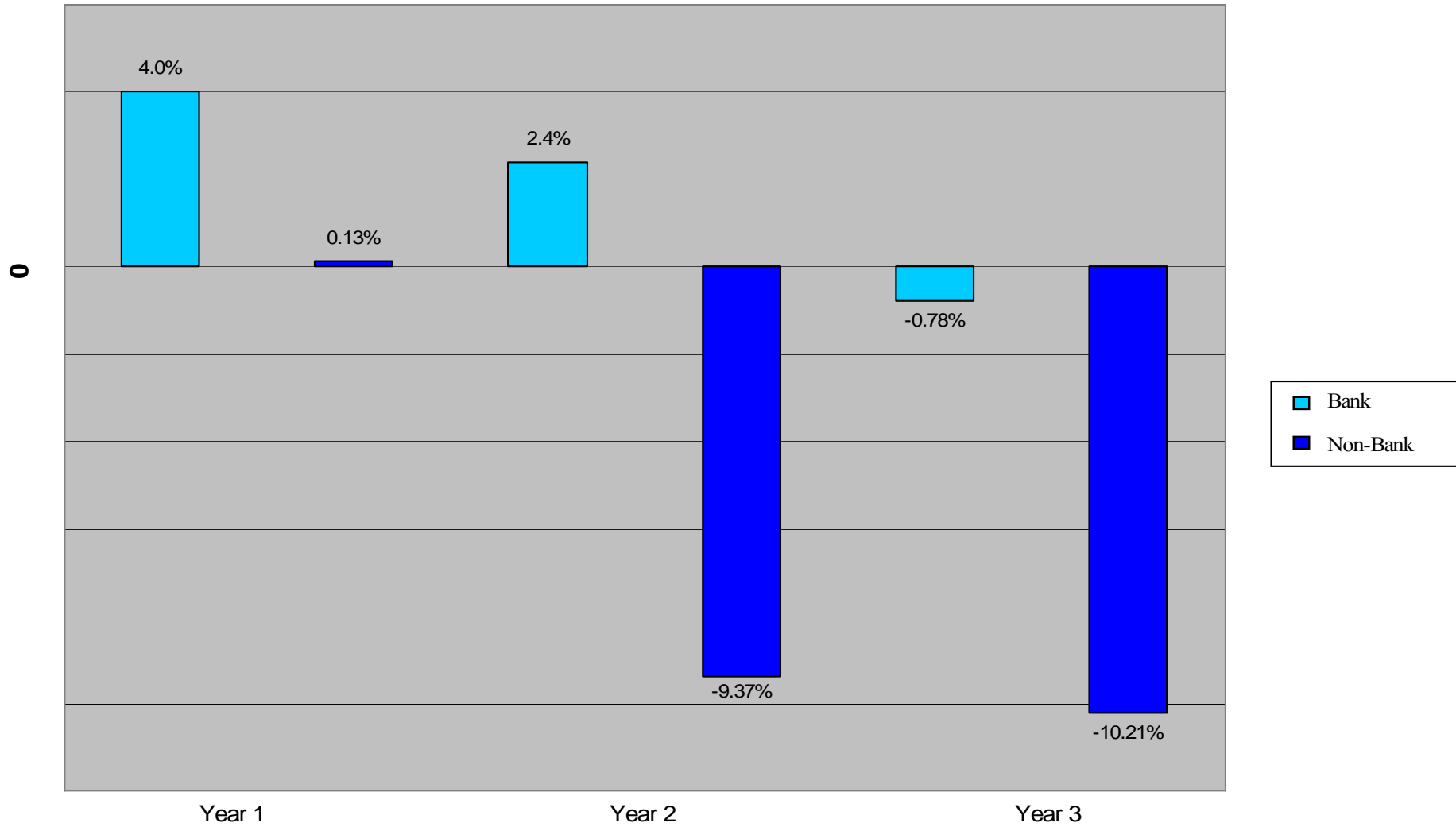


Table 1**IPO Firm Summary Statistics with and Without Banking Relationships**

The sample consists of 529 technology firms and 142 randomly selected non-technology firms that went public from January 1996 to December 2000. We categorize technology firms using the criteria described in Loughran and Ritter (2004). Firms are classified as having a banking relationship if the offering prospectus indicates that the firm has either a bank loan outstanding or a bank credit facility. Financial information is from offering prospectus, Compustat and Jay Ritter's IPO database. *Asset, sales* and *offer size* (IPO proceeds) are in US\$ Millions. *Tangible* assets are plant, property and equipment divided by assets. *Age* is years since founding. *Equity* is the book value of shareholders equity and preferred stock. *Working capital* is the difference between current assets and current liabilities. *Operating cash flows* is reported in the offering prospectus and equals net profit plus depreciation and the change in accounts payable less the change in accounts receivable and inventory. Industry adjusted variables are computed by subtracting the industry median from the IPO firm's variable. Industry medians are medians for firms with the same four digit SIC code in the same fiscal year as the IPO firm, and are computed using data from Compustat. The calculation of medians by industry by fiscal year required at least four firms. When this condition was not met and/or when there was no match with our firms, the medians were calculated using the first three digits. *VC Backing* refers to whether the firm received venture capital financing. *Internet* refers to firms classified as internet companies in Jay Ritter's IPO database and is based on a classification described in Loughran and Ritter (2004). *Initial return* is the percentage difference between the closing price on the first day of trading and the IPO offer price. *Offer size* is the number of shares offered (before any over-allotment option) times the offer price. *The Underwriter Rank* is from Jay Ritter's IPO database, and is an updated version of the Carter and Manaster (1990) ranking. *Price to Sales* is the ratio of the market value of equity (based on a computation using the first closing price) divided by the sales for the preceding 12 months as reported in the prospectus.

Panel A: Technology IPO firms

Firm Characteristics	With Bank Relationships N=395				Without Bank Relationships N=134			
	Mean	Median	High	Low	Mean	Median	High	Low
Assets (\$ millions)	57.86*	17.82*	1655.1	0.3	30.62	14.62	361	0.9
Sales (\$ millions)	39.6	17.09*	1455.76	1	24.09	8.79	761.3	1
Age (years)	8.58*	5*	80	0	6.13	4	58	0
Tangible/Assets	20.27%	14.62%	96.29%	0%	21.52%	13.87%	92.17%	0.56%
Debt/Assets	28.25%*	18.31%*	223.00%	0%	20.48%	2.02%	177.13%	.00%
Other Debt/Assets	13.54%*	1.40%	223.00%	0%	20.48%	2.02%	177.13%	.00%
Interest Expense/Sales	7.46%	1.07%	436.62%	0.0%	9%	0.63%	425.78%	0.0%
Industry-Adjusted Interest Expense/Sales	5.86%	0.37%	435.7%	-22.74%	7.48%	-0.21%	420.69%	-14.77%
Operating Cash Flows/ Sales	-44.44%*	-12.16%*	71.93%	-200%	-70.19%	-30.92%	51.92%	-200%
EBITDA/Sales	-51.05%*	-20.07%*	180.00%	-210%	-74.77%	-45.12%	42.08%	-210%
Industry-Adjusted Operating Cash Flows /Sales	-43.9%*	-13.71%*	62.89%	-200%	-69.85%	-30.62%	39.23%	-200%
Industry-Adjusted EBITDA/Sales	-26.27%	-12.96%*	200.0%	-210%	-33.97%	-32.02%	200%	-210%
VC Backing					70.89%			
% Internet					59.75%			
Offer Characteristics								
Initial Return	62.38%	28.76%	697.5%	-32.81%	75.61%	43.35%	605.56%	-24.45%
Offer Size	73.79	52.5	1076.9	8	73.01	52.75	360.5	9.6
Underwriter Rank	8.18	8.1	9.1	1.1	8.22	8.1	9.1	2.1
Aftermarket Price to Sales Ratio	40.37*	12.75*	1848	.60	65.00	27.43	1032	.49

Table 1 Cont'd.

Panel B: Non-Technology IPO firms

Firm Characteristics	With Bank Relationships N=86				Without Bank Relationships N=66			
	Mean	Median	High	Low	Mean	Median	High	Low
Assets (\$ millions)	1031.07+	43.04+	76966.7	1.26	3812.88+	36.38	217380	1
Sales(\$ millions)	198.91+	52.67*+	6902	1.69	654.36+	36.14	22478	1.06
Age (Years)	17.36+	10+	80	0	13.81+	6	80	0
Tangible/Assets	24.83%	18.67%	96.59%	0%	23.34%	13.84%	99.38%	0.05%
Debt/Assets	48.97%*	48.84%*+	157.22%	0%	26.48%	15.29%	112.31%	0%
Other Debt/Assets	21.88%	13.87%	116.21%	0%	26.48%	15.29%	112.31%	0%
Interest Expense/Sales	4.04%*	2.07%+	235.47%	0.0%	9.14%	1.93%	80.06%	0.0%
Industry-Adjusted Interest Expense/Sales	0.89%	0.71%	12.76%	-30.59%	4.44%	0.02%	72.86%	-35.01%
Operating Cash Flows/ Sales	6.22%+	6.04%+	77.35%	-200%	-11.13%	-3.23%	405.5%	-200%
EBITDA/Sales	12.2%*+	9.4%*+	63.56%	-59.14%	-14.65%	1.30%	76.17%	-200%
Industry-Adjusted Operating Cash Flows /Sales	2.58%*+	0.62%*+	99%	-170.35%	-12.47%+	-2.7%	377.75%	-196.56%
Industry- Adjusted EBITDA/Sales	29.9%*+	1.31%+	200%	-64.02%	-26.27%+	0.71%	200%	-200%
VC Backing	29.07%+				26.98%+			
Offer Characteristics								
Initial Return	12.55%+	9.97%+	76.12%	-10%	13.62%	6.25%	212.5%	-12.4%
Offer Size (\$ millions)	80.61	44.7+	1734	7	225.85	56	3657	5.3
Underwriter Rank	7.43+	8.1+	9.1	2.1	7.67	8.1	9.1	2.1
Aftermarket Price to Sales Ratio	10.67+	3.17+	126	.93	13.31+	3.40+	124	.65

*Significantly different from firms without banking relationships at the .05 level.

+Significantly different from tech firms at the .05 level.

Table 2
Summary Statistics Concerning Bank Lending Relationships with IPO Firms

The sample consists of 529 technology firms and 142 randomly selected non-technology firms that went public from January 1996 to December 2000. We categorize technology firms using the criteria described in Loughran and Ritter (2004). Firms are classified as having a banking relationship if the offering prospectus indicates that the firm has either a bank loan outstanding or a bank credit facility. Information on pre-IPO lending relationships is from the IPO offering prospectus. Information on post-IPO lending relationships is from the 10K for the first full fiscal year following the IPO. *Loan Amount* refers to the amount of bank loans outstanding prior to the IPO. *Commitment Amount* is the amount of the loan commitment. *Assets* refers to the asset of the firm. *Net worth* equals the book value of owners' equity including preferred stock. *Loan/Net worth* is computed for firms with positive values of equity. *Secured* refers to whether the bank loan or lending under the commitment is secured. Banks hold equity if the prospectus indicates the bank lender holds either equity (either common or preferred) or warrants to acquire common stock or warrants.

	Mean	Technology N=395			Min	Mean	Non-Technology N=86		Min
		Median	Max	Median			Max		
Loan Amount (Millions)	13.41	1.3*	800	0	38.51	8.93	812.5	0	
Commitment Amount (Millions)	21.67*	4.5*	900	0	50.27	11.6	900	0	
Loan/Assets	14.71%*	7.61%*	92.98%	0.0%	27.1%	21.11%	91.04%	0.0%	
Commitment/Assets	31.31%	25.57%	223.81%	0.0%	34.64%	25.97%	111.94%	0.0%	
Loan/Net Worth	.74*	.11*	20	0	2.75	.68	30.04	0	
Post-IPO Loan/Assets	1.62%*	0.0%	60.61%	0%	11.98%	0.0%	83.41%	0.0%	
% Secured	90.31%				88.31%				
% Positive EBITDA	34%*				79%				
% Positive Book Equity	57%				66%				
% With Bank Taking Equity Positions	20%				13%				

*Significantly different from the non-technology firms at the .05 level.

Table 3**A Comparison of Characteristics of Tech and Non-Tech Firms with Bank Loans**

This table compares the median firm and loan characteristics for tech and non-tech firms during the bubble (1999-2000) and pre-bubble (1996-1998) time periods. The sample consists of 529 tech and 142 non-tech firms that went public during the 1996-2000 time period. We categorize technology firms using the criteria described in Loughran and Ritter (2004) period. Firms are classified as having a banking relationship if the offering prospectus indicates that the firm has either a bank loan outstanding or a bank credit facility. Financial information is from offering prospectus, Compustat and Jay Ritter's IPO database. *Tangible* assets are plant, property and equipment divided by assets. *Age* is years since founding. *Operating cash flows* is reported in the offering prospectus and equals net profit plus depreciation and the change in accounts payable less the change in accounts receivable and inventory. Industry adjusted variables are computed by subtracting the industry median from the IPO firm's variable. Industry medians are medians for firms with the same four digit SIC code in the same fiscal year as the IPO firm, and are computed using data from Compustat. The calculation of medians by industry by fiscal year required at least four firms. When this condition was not met and/or when there was no match with our firms, the medians were calculated using the first three digits. *Loan Amount* refers to the amount of bank loans outstanding prior to the IPO. *Commitment Amount* is the amount of the loan commitment. *Secured* refers to whether the bank loan or lending under the commitment is secured.

	Bubble		Pre-Bubble	
	Tech	Non-Tech	Tech	Non-Tech
IPO Assets (\$ millions)	18.95*	68.64	16.41*	37.27
IPO Sales (\$ millions)	12.98*+	109.97	23.05*	47.22
Age (years)	5*+	18.10+	7*	8.50
Tangible/Assets	13.55%+	18.51%	17.06%	14.37%
Debt/Assets	14.58%*+	35.40%	26.67%*	49.22%
Other Debt/Assets	.01%*	19.50%	2.99%*	14.33%
Industry Adjusted Interest Expense to Sales	.35%	.15%	.20%*	.86%
Industry Adjusted Operating Cash Flows/Sales	-32.96%*+	1.94%	-5.37%*	.11%
Industry Adjusted EBITDA/Sales	-31.99%*+	4.54%	-6.56%*	-.17%
Loan/Assets	6.64%	11.03%	10.15%	20.11%
Commitment Amount/Assets	22.41%	22.42%	38.00%	27.59%
Secured	91.52%	72.72%	88.35%	90.90%
N=	246	14	148	72

*Significantly different from non-tech sample at .05 level.

+Significantly different from pre-bubble period at .05 level.

Table 4**Determinants of the Likelihood and Size of Banking Relationships among IPO firms**

Panel A provides the estimates of a probit model relating the likelihood of an IPO firm having a bank lending relationship to firm and industry characteristics. The analysis is based on a sample of 529 technology firms and 142 randomly selected non-technology firms that went public from January 1996 to December 2000. We categorize technology firms using the criteria described in Loughran and Ritter (2004). Firms are classified as having a banking relationship if the offering prospectus indicates that the firm has either a bank loan outstanding or a bank credit facility. *Tangible* is plant, property and equipment divided by assets. *Age* is years since founding and is from Jay Ritter's IPO database. Firm financial characteristics are from the offering prospectus. *Sales* is the sales of the company (in millions). *Other Debt /Assets* is the ratio of total debt minus amount of bank debt outstanding divided by total assets. *VC Backing* refers to whether the firm received venture capital financing. *Internet* refers to firms classified as internet companies in Jay Ritter's IPO database and is based on a classification described in Loughran and Ritter (2004). Panel B provides estimates of a Tobit model relating the size of the credit facility offered and the amount borrowed to firm and industry characteristics. The Tobit models are estimated using firms that report having a banking relationship. Asymptotic t statistics are reported in parenthesis.

Panel A: Probit Analysis of Likelihood of Pre-IPO Relationship			
	All Firms	Technology	Non-Technology
Tangible	.076 (.25)	-1.04 (-.27)	.469 (.91)
Log (1+Age)	.164 (2.21)	.263 (2.29)	.161 (1.43)
EBITDA/Sales	.268 (2.24)	.164* (1.76)	.878 (2.93)
Log(sales)	.111 (2.16)	.207 (2.79)	.100 (.12)
Other Debt/Assets	-.367 (-2.80)	-.227* (-1.61)	-1.14 (-2.71)
Tech	.639 (3.69)		
Internet	.038 (.280)	.017 (.13)	
VC Backed	.565 (4.05)	.572 (3.69)	.611 (1.77)
Constant	-.609 (-1.91)	-.694 (-1.68)	.068 (1.77)
Pseudo R ²	.09	.07	.124
N	673	529	142

* Significantly different from the non-tech coefficient at the .05 level.

Table 4 Cont'd.

Panel B: Determinants of the Size of the Relationship (*t* statistics are in parentheses)

	Amount Borrowed/Assets			Size of Facility/Assets		
	All Firms	Technology	Non-Technology	All Firms	Technology	Non-Technology
Tangible	.040 (.62)	.027 (.38)	-.077 (-.61)	.151 (1.97)	.272* (3.02)	-.277 (-2.10)
Log (1+Age)	.008 (.57)	.029 (1.81)	.024 (.94)	-.019 (-1.07)	-.016 (-.46)	-.008 (-.31)
EBITDA/Sales	.031 (1.92)	.061* (2.55)	.479 (2.96)	.062 (2.84)	.051* (2.22)	.519 (3.01)
Log(sales)	.002 (.13)	.026* (2.05)	-.036 (-1.64)	-.003 (.23)	.002 (.14)	-.028 (-1.21)
Other Debt/Assets	-.084 (-2.74)	-.07 (-2.34)	-.253 (-2.29)	-.004 (-.13)	.011 (.32)	-.210 (-1.84)
Tech	-.082 (-2.27)			.037 (.86)		
Internet	-.027 (-1.09)	-.047 (-1.96)		-.017 (-1.43)	-.038 (-1.98)	
VC Backed	-.031 (-1.11)	-.07* (-2.49)	.069 (1.11)	-.047 (-1.41)	-.046 (-1.22)	-.047 (-.71)
Constant	.248 (3.35)	.031 (.44)	.412 (3.44)	.357 (3.94)	.315 (2.93)	.596 (4.62)
Pseudo R ²	.254	.24	.645	.10	.136	1.00
N	481	395	86	481	395	86

* Significantly different from the non-tech coefficient at the .05 level.

Table 5
IPO First-day Returns and Private Borrowing

The Table provides estimates of the relationship between IPO first day returns and the amount of pre-IPO private borrowing relative to assets. The analysis is based on a sample of 529 technology firms and 142 randomly selected non-technology firms that went public from January 1996 to December 2000. We categorize technology firms using the criteria described in Loughran and Ritter (2004). The dependent variable is the IPO first day return measured as the percentage difference between the closing price on the first day of trading and the IPO offer price. *Bank Borrowing/Assets* is the amount of bank loans the firm has outstanding for the fiscal year end prior to the IPO relative to assets. *Other Debt/Assets* is the ratio of total debt minus amount of bank debt outstanding divided by total assets. *Age* is years since founding and is from Jay Ritter's IPO database. Firm financial characteristics are from the offering prospectus. *Sales* is the sales of the company (in millions) *Other Debt/Assets* is the ratio of total debt minus amount of bank debt outstanding divided by total assets. *Offer size* is number of shares offered (before any over-allotment option) times the offer price and is in millions. *Underwriter rank* is from Jay Ritter's IPO database and is an updated version of the Carter Manaster (1990) ranks. *Bubble* equals one if the IPO occurred in 1999 or 2000. *VC Backing* refers to whether the firm received venture capital financing (t statistics based on robust standard errors are in parenthesis).

Debt/Assets	-22.53 (-2.37)	
Bank Borrowing/Assets		-32.13 (-2.55)
Other Debt/Assets		-19.05 (-1.90)
EBITDA/Sales	7.37 (1.38)	7.89 (1.22)
Log(sales)	-10.17 (-2.88)	-10.26 (-2.78)
Log (1+Age)	-7.06 (-1.84)	-7.33 (-2.25)
Log(Proceeds)	27.51 (5.40)	27.43 (4.56)
Underwriter Rank	2.23 (.84)	2.26 (1.12)
Tech	17.48 (2.07)	17.74 (3.38)
Bubble	29.45 (4.04)	29.23 (5.28)
VC Backed	10.25 (1.38)	10.33 (1.67)
Constant	-53.97 (-2.52)	-53.56 (-3.27)
R ²	.22	.23
N	623	623

Table 6

Loan and Financial Characteristics of Firms with Banking Relationships Grouped By the Size of the Bank Lender

The sample consists of 208 technology firms that went public from January 1996 to December 2000 with their bank lenders identified in the offering prospectus. We defined technology firms using the criteria methodology described in Loughran and Ritter (2004). Firms are classified as having a banking relationship if the offering prospectus indicates that the firm has either a bank loan outstanding or a bank credit facility. Financial information is from the offering prospectus and Jay Ritter's IPO database. Boutique bank lenders are banks or bank holding companies with less than \$10 billion in inflation adjusted assets at the end of the year that the borrower went public. Large bank lenders have more than \$10 billion in inflation adjusted assets. *Asset, sales and offer size* (IPO proceeds) are in US\$ Millions. *Tangible* is plant, property and equipment divided by assets. *Age* is years since founding. *Equity* is the book value of shareholders' equity and preferred stock. *Working capital* is the difference between current assets and current liabilities. *Price to Sales* is the ratio of the market value of equity (computed using the IPO offer price) divided by the sales for the preceding 12 months as reported in the prospectus. *Operating cash flows* is as reported in the offering prospectus and equals net profit plus depreciation and the change in accounts payable less the change in accounts receivable and inventory. Industry adjusted variables are computed by subtracting the industry median from the IPO firm's variable. Industry medians are medians for firms with the same four digit SIC code in the same fiscal year as the IPO firm and are computed using data from Compustat. The calculation of medians by industry by fiscal year required at least four firms. When this condition was not met and/or when there was no match with our firms, the medians were calculated using the first three digits. *VC Backing* refers to whether the firm received venture capital financing. *Internet* refers to firms classified as internet companies in Jay Ritter's IPO database and is based on a classification described in Loughran and Ritter (2004). *Initial return* is the percentage difference between the closing price on the first day of trading and the IPO offer price. *Underwriter rank* is from Jay Ritter's IPO database and is an updated version of the Carter Manaster (1990) ranking. *Loan Amount* refers to the amount of bank loans outstanding prior to the IPO. *Commitment Amount* is the amount of the loan commitment. *Assets* refers to the assets of the firm. *Secured* refers to whether the bank loan or lending under the commitment is secured. Banks hold equity if the prospectus indicates that the bank lender holds either equity (common or preferred) or warrants to acquire common stock.

Panel A: Firm Characteristics

Firm Characteristics	Boutique Bank Lender (N=109)				Large Bank Lender (N=99)			
	Mean	Median	High	Low	Mean	Median	High	Low
Assets (\$ millions)	37.47*	18.36	614.79	1.73	88.73	20.52	1,655.1	.63
Sales (\$ millions)	26.52*	14.45*	596.85	1.00	55.90	27.33	781.62	1.08
Age	7.11*	5*	80	.00	9.88	7	66	.00
Tangible/Assets	19.21%	14.20%	91.23%	.00%	18.35%	12.76%	84.65%	.00%
Debt/Assets	38.25%	15.21%	121.19%	.00%	38.23%	30.28%	193.03%	.00%
Other debt/Assets	13.38%	2.72%	105.53%	.00%	17.44%	4.65%	153.32%	.00%
Interest Expense/Sales	4.51%	1.38%	68.00%	.00%	17.44%	1.18%	436.61%	.00%
Operating Cash Flows/Sales	-65.72%*	-34.89%*	66.83%	-200.00%	-22.48%	-1.98%	26.58%	-200.00%
EBITDA/Sales	-74.46%*	-40.55%*	180.10%	-210.00%	-21.84%	.33%	82.38%	-210.00%
Industry-Adjusted Operating Cash Flows /Sales	-65.48%*	-36.82%*	62.82%	-200.00%	-24.59%	-4.08%	48.97%	-200.00%
Industry- Adjusted EBITDA/Sales	-39.44%*	-24.30%*	187.00%	-210.00%	13.35%	-1.64%	187.00%	-210.00%
VC Backing	80.34%*				46.73%			
% Internet	58.92%				52.77%			
Offer Characteristics								
Initial Return	67.35%*	40.90%*	313.33	-32.18%	36.84	17.40	314.83	-21.83
Offer Size (\$ millions)	64.73	49.50	376.00	15.00	73.24	50.70	550.00	8.00
Underwriter Rank	8.33	9.1	9.1	1.1	7.66	8.1	9.1	1.1
Price/Sales	35.36*	16.62*	751.33	.80	23.04	7.37	623.36	.61

Panel B: Loan Characteristics

	Boutique Bank Lender				Large Bank Lender			
	Mean	Median	Max	Min	Mean	Median	Max	Min
Loan Amount (Millions)	5.41*	1.40*	250	.00	27.80	2.50	800	.00
Commitment Amount (Millions)	9.32*	4.4*	250	.41	43.02	7.00	900	.25
Loan/Assets	11.91*	6.10	80.92	.00	20.60	13.84	88.51%	.00
Commitment/Assets	29.13*	24.08	134.19	.03	41.29	30.20	228.13	.05
Post-IPO Loan/Assets	1.02%	.00	15.61%	.00	3.11%	.00	50.42	.00
% Secured	92%				93%			
% With Bank Taking Equity Positions	31.73*				13.43			

* Significantly different from large bank sample at the .05 level

Table 7**Univariate Analysis of the Effect of Pre-IPO Banking Relationships on Post-IPO Operating Performance**

Panel A provides summary statistics on operating performance for the year before and three years following the IPO for a sample of 529 technology firms that went public from January 1996 to December 2000. Panel B presents summary statistics for a balanced panel of tech firms with information for three years following the IPO. Panel C provides summary statistics on operating performance for a random sample of 142 non-technology firms. Panel D presents summary statistics for a balanced panel of non-tech firms with information for three years following the IPO. Data on pre-IPO operating performance is from the offering prospectus and information on post-IPO operating performance is from Compustat. Year refers to the number of years following the IPO. Year zero refers to the last fiscal year prior to the IPO. Industry adjusted performance is measured by subtracting the industry median from the firm's performance measure level. Industry is defined by the four digit SIC codes.

Panel A: Technology Firms Unbalanced Panel								
	EBITDA/Sales				Industry Adjusted EBITDA/Sales			
	Bank		Non-Bank		Bank		Non-Bank	
	Median	N	Median	N	Median	N	Median	N
Year 0	-20.07%*	395	-45.11%	135	-12.92%*	395	-32.02%	134
Year 1	-4.30%*	353	-44.40%	124	-9.85%*	353	-43.50%	124
Year 2	-5.50%*	335	-29.06%	117	-5.51%*	335	-22.20%	117
Year 3	-4.11%	272	-16.73%	103	-7.29%+	272	-24.34%	103

Panel B: Technology Firms Balanced Panel								
	EBITDA/Sales				Industry Adjusted EBITDA/Sales			
	Bank		Non-Bank		Bank		Non-Bank	
	Median	N	Median	N	Median	N	Median	N
Year 0	-8.30%*	272	-40.15%	103	-11.96%*	272	-31.74%	103
Year 1	3.55%*	272	-32.75%	103	-3.92%*	272	-36.08%	103
Year 2	-.09%*	272	-23.57%	103	-1.32%*	272	-20.65%	103
Year 3	-4.11%	272	-16.73%	103	-7.29%+	272	-23.85%	103

Panel C: Non-Technology Firms Unbalanced Panel								
	EBITDA/Sales				Industry Adjusted EBITDA/Sales			
	Bank		Non-Bank		Bank		Non-Bank	
	Median	N	Median	N	Median	N	Median	N
Year 0	9.40%*	86	5.16%	65	1.30%	86	.71%	65
Year 1	16.20%*	75	10.60%	57	2.40%+	75	.40%	57
Year 2	13.92%	75	12.60%	57	4.44%+	75	1.10%	57
Year 3	11.11%	63	9.04%	43	4.45%*	63	-2.09%	43

Panel D: Non-Technology Firms Balanced Panel								
	EBITDA/Sales				Industry Adjusted EBITDA/Sales			
	Bank		Non-Bank		Bank		Non-Bank	
	Median	N	Median	N	Median	N	Median	N
Year 0	8.5%	63	6.14%	43	.47%	63	-.33%	43
Year 1	17.61%*	63	10.06%	43	3.77%+	63	2.0%	43
Year 2	14.41%	63	11.16%	43	5.19%+	63	1.09%	43
Year 3	11.11%	63	9.04%	43	4.45%*	63	-2.09%	43

* Significantly different from the non-bank median at the .05 level.

+ Significantly different from the non-bank median at the .10 level.

Table 8**Banking Relationships and Post-IPO Operating Performance**

The table provides OLS estimates relating operating performance one and three years after the IPO to firm characteristics at the time of the IPO for a sample of 529 technology firms and 142 randomly selected non-technology firms that went public from January 1996 to December 2000. We categorize technology firms using the criteria described in Loughran and Ritter (2004). Year 1 and Year 3 refer to the first and third year following the IPO. The dependent variable is industry- adjusted EBITDA/Sales and is computed as the difference between the IPO firm's performance and the median performance for firms in the same 4 or 3 digit SIC code. *Age* is years since founding and is from Jay Ritter's IPO database. Firm financial characteristics are from the offering prospectus. *IPOEBITDA/Sales* is the firm's industry adjusted EBITDA/Sales for the fiscal year end prior to the IPO. *Retain* is a dummy variable that takes on the value of one if the firm has bank loans outstanding the year after the IPO. *OtherDebt/Assets* is the ratio of non-bank debt and other liabilities to total assets at the fiscal year end prior to the IPO. *VC Backing* refers to whether the firm received venture capital financing. *Internet* refers to firms classified as internet companies in Jay Ritter's IPO database and is based on a classification described in Loughran and Ritter (2004). *Postbubble* is a binary variable that equals 1 if performance observation occurs after 1999. *Pre-IPO loans/Assets* is the dollar amount of bank loan outstanding in the fiscal year end before the IPO divided by the pre-IPO assets. (t statistics are based on robust standard errors and are in parentheses)

	Technology				Non-Technology			
	Industry Adjusted		Industry Adjusted		Industry Adjusted		Industry Adjusted	
	Year 1	Year 3	Year 1	Year 3	Year 1	Year 3	Year 1	Year 3
Pre-IPO Loan Amount/Assets	.611 (4.11)	.373 (2.42)	.818 (4.83)	.317 (1.74)	.437 (1.91)	.911 (3.13)	.322 (1.31)	1.029 (2.76)
Pre-IPO EBITDA/Sales	.275 (5.43)	.143 (3.02)	.272 (5.37)	.144 (3.03)	.154 (2.46)	.23 (2.57)	.156 (2.48)	.235 (2.57)
Retain*Pre-IPO Borrowing			-6.01 (-2.70)	.157 (.76)	-	-	.225 (1.33)	-.182 (-.65)
Other Debt/Assets	.032 (.34)	.138 (2.03)	.028 (.291)	.141 (2.07)	.062 (2.95)	.270 (1.60)	.063 (.42)	.273 (1.60)
Log (1+Age)	.289 (6.74)	-.091 (2.91)	.287 (6.74)	.091 (2.91)	.089 (2.95)	.024 (.56)	.093 (2.96)	.022 (.51)
Internet	.104 (1.77)	-.065 (-.960)	.101 (1.72)	-.066 (-.96)	-	-	-	-
Post Bubble	-.252 (-3.82)	-.142 (-2.36)	-.256 (-3.90)	-.152 (-2.35)	-.435 (-2.27)	.109 (.94)	-.436 (-2.26)	.113 (.97)
VC Backed	-.190 (-2.82)	-.110 (-1.82)	-.194 (-2.88)	-.110 (-1.81)	-.242 (-1.60)	-.335 (-1.92)	-.235 (-1.61)	-.336 (-1.92)
Constant	-.888 (-6.30)	-.352 (-3.06)	-.875 (-6.27)	-.352 (-3.06)	-.357 (-2.75)	-.475 (-3.34)	-.337 (-2.79)	-.473 (-3.33)
R ²	.323	-.159	.32	.154	.32			
N	511	409	511	409	136	103	136	103