



What Do We Know about the Capital Structure of Privately Held US Firms? Evidence from the Surveys of Small Business Finance

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This study examines the capital-structure decisions of privately held US firms using data from four nationally representative surveys conducted from 1987 to 2003. Book-value firm leverage, as measured by either the ratio of total loans to total assets or the ratio of total liabilities to total assets, is negatively related to firm age and minority ownership; and is positively related to industry median leverage, the corporate legal form of organization, and to the number of banking relationships. In general, these results provide mixed support for both the Pecking-Order and Trade-Off theories of capital structure.

What do we know about the capital structure of privately held US firms? The answer is “not much,” as almost all existing empirical studies of the capital structure of US firms have relied upon Compustat data for large corporations with publicly traded securities.¹ Although such large, publicly traded corporations hold the vast majority of business assets, they account for only a small fraction of the number of business entities. In the United States, for example, there are fewer than 10,000 firms that issue publicly traded securities, yet according to the US Internal Revenue Service, there were approximately 30 million small businesses as of 2006.²

Privately held firms are vital to the US economy. According to the US Small Business Administration, small businesses account for half of all US private sector employment, produce more

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¹ See Frank and Goyal (2008) for a recent summary of the literature on the capital structure of public US companies. Two notable exceptions that look at the capital structure of private US firms are Robb and Robinson (2010), which analyzes the capital structure of start-up firms using data from the Kauffman Firm Survey, and Ang, Cole, and Lawson (2010) that analyzes the capital structure of small firms using data from the 2003 Survey of Small Business Finances. In addition, Brav (2009) examines the capital structure of privately held firms in the UK.

² See the US Internal Revenue Service statistics for nonfarm sole proprietorships at <http://www.irs.gov/taxstats/indtaxstats/article/0,,id=134481,00.html>, for partnerships at <http://www.irs.gov/taxstats/bustaxstats/article/0,,id=97153,00.html>, and for corporations at <http://www.irs.gov/taxstats/bustaxstats/article/0,,id=97145,00.html>. The year 2006 is used for reference, as it was the latest year for which statistics were available at the time this article was written.

than half of the nonfarm private gross domestic product (GDP), and generated almost two-thirds of the net job growth over the past 15 years.³

Privately held firms also are fundamentally different from the public firms that have enjoyed so much attention from researchers. Ang (1991, p.1) writes “the theory of modern corporate finance is not developed with small businesses in mind” as “the stylized theoretical firm is assumed to have access to external markets for debt and equity” and “shareholders have limited liability and own diversified portfolios.” Berger and Udell (1998, pp. 615-616) write “the private markets that finance small businesses . . . are so different from the public markets that fund large businesses” and “perhaps the most important characteristic defining small business finance is informational opacity.” Ang, Cole, and Lin (2000) find that ownership is much more highly concentrated at private firms so that owner-manager agency problems are typically less severe than at public companies.

Ang (1992, pp. 194-196) includes a number of reasons as to why privately held firms should be more highly levered than public firms. These include the value of reputation and informal relationships, no (or partial) limited liability, fewer lenders, quasi-equity and unreported equity, and behavioral issues such as risk-taking overoptimistic entrepreneurs.

He also suggests reasons for lower leverage. These include tax disadvantages relative to public firms, the desire to maintain control leading owners to forego projects that require outside financing, a lack of diversification on their personal portfolio, and the high costs to a lender of monitoring a large number of small businesses. For these reasons and many more, there is little reason to think that the fundamental determinants of capital structure at public companies documented by Frank and Goyal (2009) hold true for private firms.

Therefore, a fundamental and unresolved issue in the finance literature is what factors are reliably important in determining the capital structure of privately held firms. I examine the capital structure of private US firms based upon data from four nationally representative surveys conducted by the Federal Reserve Board spanning 16 years from 1987 to 2003.

My univariate results indicate that firm leverage at privately held firms, as measured by either the ratio of total loans to total assets or by the ratio of total liabilities to total assets:

- (1) is consistently higher at corporations than at proprietorships and partnerships;
- (2) is consistently higher at larger firms than at smaller firms;
- (3) is consistently higher at younger firms than at older firms; and
- (4) is consistently lower at firms whose primary owner is female or black than at firms whose primary owner is a white male.

I find that that privately held firms, in general, employ a comparable degree of leverage relative to small publicly traded firms when leverage is measured by the ratio of loans to assets, but employ less leverage when leverage is measured by the ratio of total liabilities to total assets. This finding is quite different from Brav (2009), who reports that in the United Kingdom, private firms use much more leverage than do public firms.

I find that leverage ratios by industry of privately held and public firms are highly correlated in most years when leverage is measured by loans to assets, but less so when leverage is measured by liabilities to assets. Hence, these differences appear to be driven by the use of trade credit. Small firms are thought to me more reliant upon trade credit than are larger firms.

³ See “Frequently Asked Questions,” Office of Advocacy, US Small Business Administration (SBA) at: <http://www.sba.gov/sites/default/files/files/sbfaq.pdf>. For research purposes, the SBA and Federal Reserve Board define small businesses as independent firms with fewer than 500 employees. I follow that definition in this research.

In addition to my univariate tests, I conduct multivariate tests where I use weighted-least-squares regressions to analyze the determinants of my two leverage ratios. These results reveal that firm leverage as measured either by the ratio of total loans to total assets or by the ratio of total liabilities to total assets:

- (1) is consistently and positively related to median industry leverage;
- (2) is consistently higher at corporations than at proprietorships;
- (3) is consistently lower at older firms;
- (4) is consistently higher at firms with more bank and nonbank relationships;
- (5) is consistently lower at profitable firms;
- (6) is consistently higher at firms with more bank and nonbank relationships;
- (7) is consistently higher at firms that have recently taken out a loan; and
- (8) is consistently lower at minority-owned firms than at white-owned firms.

I also find a consistently negative relation between leverage and firm size at private firms, whereas Frank and Goyal (2009) document a consistently positive relation at public companies. Further analysis, however, reveals that my negative association is driven by negative-equity firms, which make up between 8% to 22% of my samples. When I limit my analysis to positive-equity firms, I find inconsistent results across the four surveys for the relation between leverage and firm size. I also find that the consistently positive relation between leverage and profitability disappears, as unprofitable firms are disproportionately found in the negative-equity subsamples.

My study contributes to the capital-structure literature in at least five important ways. First, I complement Frank and Goyal (2009), who document the factors that are reliably important in predicting book-value leverage at public US companies. Here, I determine the factors that are reliably important in predicting book-value leverage at privately held US companies.⁴

Second, I provide new evidence regarding how the use of financial institutions influences capital structure, which also contributes to the literature on relationship lending (Petersen and Rajan, 1994; Berger and Udell, 1995, 2002; Cole, 1998; Boot, 2000; Degryse and Cayseele, 2000; Detragiache, Garella, and Guiso, 2000; Ongena and Smith, 2000; Cole, Goldberg, and White, 2004). As Berger and Udell (1998) write, “financial intermediaries play a critical role in the private (capital) markets.” I find that a firm with no banking relationships has significantly lower leverage, whereas a firm with multiple banking relationships has significantly higher leverage than a firm with a single banking relationship. In contrast, Cole (1998) finds that a firm with multiple banking relationships is more likely to be denied credit on any particular credit application. This suggests that the increased probability of denial on a particular application can be offset by multiple credit applications at different prospective lenders.

Third, I provide new evidence regarding how the characteristics of the firm’s primary owner influence capital structure, which contributes to a growing literature on this topic (Mishra and McConaughy, 1999; McConaughy, Matthews, and Fialko, 2001; Villalonga and Amit, 2006; Ang et al., 2010). I find that minority-owned firms generally choose less leverage. This is consistent with the existence of discrimination in the credit markets for small firms, as reported by Cavalluzzo and Cavalluzzo (1998), Cole (1999, 2009), Cavalluzzo, Cavalluzzo, and Wolken (2002), and Blanchflower, Levine, and Zimmerman (2003). None of my other owner characteristics are consistently reliable in explaining firm leverage across the four surveys.

⁴ Berger and Udell (1998) discuss the distribution of debt at small US firms based upon 1993 data, but do not analyze the determinants of capital structure.

Fourth, I provide new evidence as to how the use of credit cards and trade credit influences capital structure, contributing to the literature on trade credit (Meltzer, 1960; Petersen and Rajan, 1997; Atanasova, 2007, 2012; Cole, 2009, 2010; Giannetti, Burkart, and Ellingsen, 2011; Atanasova, 2012; Molina and Preve, 2012). I find that firms using credit cards to roll over balances from month-to-month generally use more leverage, suggesting that such credit card debt is a complement, rather than a substitute, for bank debt. I find that firms using trade credit are no more highly levered than firms that do not use trade credit, suggesting that trade credit is a substitute, rather than a complement, for bank credit. This last finding provides support for the price-discrimination theory first put forth by Meltzer (1960).

Finally, I provide new evidence regarding which of the competing theories of capital structure best predicts the capital structure of private companies. As Myers (2001) points out, capital-structure theories “are not designed to be general” so that “testing them on a broad, heterogeneous sample of firms can be uninformative.” In general, my results are mixed, providing some support for both the Pecking-Order and Trade-Off theories.

In Section I, I provide a brief summary of the three major competing theories of capital structure and their empirical predictions. In Section A, I describe my data and methodology. In Section B, I present my results, followed by a summary and my conclusions in Section C.

I. The Three Major Competing Theories of Capital Structure

Almost 50 years have passed since the seminal work of Modigliani and Miller (1958, 1963) regarding the importance of capital structure. Yet the seemingly simple question as to how firms should best finance their fixed assets remains a contentious issue. The empirical evidence regarding a firm’s optimal mixture of financing during this time period is both voluminous and mixed in the aggregate.⁵ Although there is no consensus, three competing theories—the Pecking-Order Theory, the Trade-Off Theory, and the Market-Timing Theory—have emerged as the finance profession’s best explanations for the capital-structure decision. This section provides only a brief review of these three theories. For an excellent and detailed review of the literature, I refer the reader to Frank and Goyal (2008).

A. The Pecking-Order Theory

The Pecking-Order Theory (Myers and Majluf, 1984; Myers, 1984) relies upon the concept of asymmetric information between managers and investors that guides managers in their preference for raising funds. According to this theory, firms opt for funding from sources with the lowest degrees of asymmetric information because the cost of borrowing rises with this metric. This leads the firm to a “pecking order” in its search for funding, first using internally generated funds (primarily retained earnings), then tapping private debt (primarily in the form of loans from financial institutions), and seeking equity from outside sources only as a last resort.⁶ Hence, a firm’s capital structure is simply the result of previous independent decisions to raise capital. As a consequence, there is no “optimal” ratio of debt to equity under the Pecking-Order Theory (hereafter “POT”).

⁵ Surveys of studies on capital structure include Bradley, Jarrell, and Kim (1984), Masulis (1988), Harris and Raviv (1991), Myers (2001), and Frank and Goyal (2008).

⁶ Public firms typically do not use dividend policy to adjust capital structure because dividend cuts are severely punished in equity markets. It is not clear if the “stickiness” of dividends also applies to privately held firms.

B. The Trade-Off Theory

Under the Trade-Off Theory of capital structure (hereafter “TOT”), the firm seeks to balance the tax benefits from using debt (which arise in the United States because interest payments are deductible business expenses, while dividend payments are not) against the costs of financial distress that rise at an increasing rate with the use of leverage. Hence, this theory predicts an “optimal” ratio of debt to equity, where the tax benefits of deductible interest are just offset by the costs of financial distress. For public firms, Graham (2000) estimates that the tax benefits of debt are equal to almost 10% of a firm’s market value. Given this idealized target, each financing decision by the firm is designed to move its capital structure toward this optimal ratio.

C. The Market-Timing Theory

The Market-Timing Theory of capital structure (hereafter “MTT”) is the most recent addition to the mix, emerging from a study by Baker and Wurgler (2002) that considers how the efforts of management to “time” the issuance of equity relate to the firm’s capital structure. According to this theory, firms will raise capital by issuing equity in hot equity markets and by issuing debt in cold equity markets. The resulting capital structure of a firm is simply a function of when it needed to raise new capital. Firms needing capital during hot equity markets will have relatively low ratios of debt to equity, whereas firms needing capital during cold equity markets will have relatively high ratios of debt to equity. As with the POT, there is no “optimal” capital structure predicted by the MTT.

D. Predictions of the POT and TOT for Privately Held Firms

To summarize, there are three major competing theories—the POT, the TOT, and the MTT—that have emerged as the finance profession’s best explanations for capital-structure decisions. However, only the first two of these three theories are relevant for privately held firms that do not issue publicly traded securities.

Both the POT and the TOT generate a number of testable hypotheses that often lead to conflicting empirical predictions, as outlined in Frank and Goyal (2009). However, it is important to note that, when the POT is applied to privately held firms, the empirical predictions can be quite different than for public firms because the vast majority of private firms have zero access to outside equity.⁷ When outside equity is removed from the pecking order, the firm is left with a choice between inside equity from owners and private debt, primarily in the form of bank loans.

1. Firm Size

The TOT predicts a positive relation between leverage and firm size. Firm size influences the probability of financial distress. Larger firms are more diversified and have been shown empirically to have lower probabilities of default.

Typically, there is much more information available in the marketplace about larger firms than about smaller firms, so informational asymmetries between insiders and outsiders will be less severe at larger firms. This implies that a larger firm can more easily borrow from banks and other sources of credit than a smaller firm. Hence, the POT implies a positive relation between leverage and firm size.

⁷ According to Berger and Udell (1998), angel financing and venture capital account for only about 6% of total equity at privately held firms. Robb and Robinson (2010) report that only about one in 20 start-up firms have access to outside equity.

Typically, three alternative variables are used in the finance and entrepreneurship literatures to measure firm size: 1) total assets, 2) annual sales revenues, and 3) total employment.⁸ I focus on (the natural logarithm of) total assets, as this measure is most commonly used in the literature and is highly correlated with the other two measures. I use the log transformation because I expect that a \$1,000 difference in assets is more important to the leverage of a small firm than to the leverage of a large firm.

2. Firm Age

Older firms are typically more creditworthy, profitable, and diversified than younger firms, so they have lower probabilities of financial distress. Consequently, the TOT predicts a positive relation between leverage and firm age.

By definition, older firms have longer track records than younger firms, having had more time to establish a reputation; consequently, informational asymmetry between insiders and outsiders should be less severe at older firms. As with firm size, this implies that an older firm could more easily borrow from banks and other sources of credit. Alternatively, older firms have had more time to generate retained earnings and build financial slack, implying a negative relation between leverage and firm age. Consequently, the prediction of the POT with respect to the relation between leverage and firm age is ambiguous.

I measure firm age by (the natural logarithm of) the number of years that the firm has been in business under current management. I use the log transformation because I expect that a one-year difference in age is more important to the leverage of a young firm than to the leverage of an old firm.

3. Profitability

Firm profitability strongly influences the probability of financial distress. The more profitable is the firm, the less likely it is to default on its liabilities. In addition, the more profitable is the firm, the more taxes it can avoid by employing higher leverage. For both reasons, the TOT predicts a positive relation between leverage and firm profitability. The more profitable is the firm, the greater is the availability of internally generated funds. Therefore, the POT predicts a negative relation between leverage and profitability.

The Survey of Small Business Finances (SSBFs) provide information regarding the net income of the firm; this enables us to construct the most common measure of profitability, return on assets (ROA), which is defined as net income divided by total assets. However, SSBF data on net income are noisy, with a significant portion of the observations requiring imputation. Moreover, when I construct ROA from net income and total assets, I find many extreme values. To deal

⁸ Measuring the size of privately held firms is problematic. Total assets is probably the most common measure, but, in my samples, problems exist with respect to both missing values and outliers. First, a small portion of the firms did not report total assets to Survey of Small Business Finances (SSBF) interviewers, forcing Federal Reserve Board (FRB) staff to impute these values. Second, many firms that did report total assets reported values that appear to be inconsistent with other measures of size. This is especially problematic for very small firms in the service industries that have few assets, yet generate significant sales revenues and employ many workers. Sales revenues present similar, but less severe, problems. Some firms report zero or very small values of sales revenues. Total employment presents the fewest problems in both of these respects. All firms reported a value for employment, as this was a sampling criterion, and outliers are uncommon because firm size was limited to 500 or fewer employees. However, the surveys had to deal with how to classify firms reporting zero employees—firms whose owners did all of the work and had no salaried employees. The early surveys replaced zero values with one-half of an employee, assuming that the owner worked at least part-time. The 2003 survey finally recognized that zero employee firms are not unusual, and that owners are not “employees” as defined by US employment and tax laws.

with these outliers, I winsorize ROA at the 5th and 95th percentiles. In addition, I construct a zero-one indicator variable for profitable firms, that is, those firms reporting profits greater than zero. This indicator variable is a simpler and cleaner measure of profitability than ROA that is unaffected by extreme values.

4. Liquidity

Liquid assets can readily be converted into cash, so the expected costs of financial distress are lower for firms with a higher portion of their assets invested in liquid assets. Therefore, the TOT predicts a positive relation between leverage and liquidity.

Liquid assets also provide a firm with financial slack, enabling a firm to take advantage of unexpected investment opportunities without having to raise new outside capital. The POT posits that firms value “financial slack,” implying that such firms will borrow in normal times to preserve liquidity for unexpected opportunities. Alternatively, profitable firms that generate retained earnings are expected to have more liquid assets, *ceteris paribus*. If liquidity is a function of profitability and profitability is difficult to measure (as I note above), then the POT would predict a negative relation between leverage and liquidity. Therefore, the POT is ambiguous in its prediction about the relation between leverage and liquidity.

For small firms, the primary liquid asset is cash. Consequently, I use the ratio of cash and cash equivalents to total assets as my measure of liquidity.

5. Tangible Assets

Tangible assets can be pledged as collateral to obtain preferential financing. In addition, these assets suffer smaller percentage losses in liquidation. For both reasons, the expected costs of financial distress are negatively related to the portion of a firm’s assets that are tangible. Hence, the TOT predicts a positive relation between leverage and the tangibility of assets.

Harris and Raviv (1991) argue that the problem of asymmetric information is smaller when a firm has more tangible assets that can readily be valued. As with firm size and firm age, this implies that a firm with more tangible assets could more easily borrow from banks and other sources of credit. Hence, the POT also implies a positive relation between leverage and the tangibility of assets.

Researchers typically measure tangible assets using the ratio of fixed assets (plant, property, and equipment) to total assets. I also use this definition in my analysis, defining tangible assets as the sum of the SSBF variables “land” and “depreciable assets” for the 1993, 1998, and 2003 SSBFs; for the 1987 SSBF, I use the single variable for plant, property, equipment, and intangible assets.

6. Growth Prospects

The expected costs of financial distress are greater for a firm with better growth opportunities because the value of these opportunities is an intangible asset (although not necessarily a book value), and much of the value of these growth opportunities is lost in financial distress because they cannot be funded and realized. If the TOT is correct, then I should observe a negative relation between proxies for growth opportunities and firm leverage.

Growth opportunities are notoriously difficult to value, but especially so by observers outside the firm, so that asymmetric information should be more severe when a firm has more growth opportunities. In this case, the firm with better growth prospects would find it more difficult to borrow from a bank or other source of credit. Thus, the POT predicts a negative relation between leverage and growth opportunities.

To measure growth opportunities, I rely upon a proxy created from information on current and prior period sales. I construct a dummy variable indicating that a firm reported an increase in sales from the prior period. The 2003 SSBF did not collect information on the value of prior period sales, but only whether sales revenues had increased, decreased, or remained the same since the prior period. Consequently, I construct my growth dummy for the 2003 SSBF based upon whether or not sales had increased.

As a robustness test, I also construct proxies for growth opportunities based upon current and prior period employment. I construct a dummy variable indicating that a firm reported an increase in employment from the prior period. Unfortunately, the 1998 SSBF did not collect information on prior period employment, so I cannot perform this test for that survey.

7. Creditworthiness

Firms that are more creditworthy have lower probabilities of financial distress. According to the TOT, such firms should use more leverage. Therefore, the TOT predicts a positive relation between leverage and creditworthiness.

To the extent that creditworthiness is correlated with the amount of publicly available information about the firm, asymmetric information should be lower for more creditworthy firms. Hence, a more creditworthy firm should find it easier to borrow from a bank or other source of credit. Consequently, the POT also predicts a positive relation between leverage and creditworthiness.

The various iterations of SSBFs include several variables that provide information about the creditworthiness of the firm: 1) the number of business delinquencies during the past three years, 2) the number of personal delinquencies of the primary owner during the past three years, 3) whether the firm and/or primary owner has declared bankruptcy within the past seven years, 4) whether any judgments had been rendered against the primary owner during the past three years, 5) whether the firm has ever been denied trade credit, and 6) whether the firm has paid late on its trade credit. However, only one of these variables is available across all four surveys—whether or not the firm has made late payments on its trade credit. Consequently, I use this as my primary measure of credit quality. I use the other variables as measures of robustness.

8. Industry Leverage

The TOT posits that firms target an “optimal” leverage ratio. According to Frank and Goyal (2008), the industry median leverage ratio is a likely proxy for firms to use as their target. If the industry median is a good proxy for this target and the TOT is correct, then I should observe a positive relation between firm leverage and the industry median leverage. The POT has no direct implications for industry leverage, so that its predicted relation between firm leverage and the industry median leverage is ambiguous.

I measure the industry median leverage at both the one-digit and two-digit standard industrial classification level. My primary measure is based upon two-digit standard industrial classification code (SIC), but I substitute one-digit SIC leverage for a small number of two-digit industries with fewer than five firms.⁹

9. Summary of Key Predictions of the POT and TOT

Below is a summary of the key predictions regarding the POT and the TOT as outlined earlier. For four of the eight factors, the predicted sign is the same for both theories, whereas for three

⁹ There are fewer than five observations for two-digit SICs: 14, 21, 26, 45, 66, and 67 (1987); 12, 14, 29, and 31 (1993); 14, 29, 44, and 84 (1998); and 14, 29, 31, 45, 53, and 84 (2003). In total, there are firms in 57 different two-digits SICs for 1987 and 2003, 59 for 1998, and 61 for 1993.

of them, the POT is ambiguous. This leaves only profitability as presenting a clear distinction between the two theories, although empirical evidence could favor the POT where it is ambiguous if the empirical evidence contradicts the prediction of the TOT. Hence, it is extremely difficult to test which of the two theories best explains capital structure at privately held firms, especially when one is confined to cross-sectional data, as I am when examining the SSBFs. Consequently, I focus instead on establishing a set of factors that reliably explain capital structure at privately held US firms, just as Frank and Goyal (2009) have done for public US firms.

Variables Used to Explain Capital Structure at Privately Held Firms: Expected Signs Under Alternative Theories

Variable	Pecking-Order Theory	Trade-Off Theory
1. Firm size	+	+
2. Firm age	?	+
3. Profitability	—	+
4. Liquid assets	?	+
5. Tangible assets	+	+
6. Growth prospects	—	—
7. Creditworthiness	+	+
8. Industry “Target” leverage ratios	?	+

10. Additional Factors for Explaining Capital Structure at Privately Held Firms

In addition to the traditional firm characteristics outlined earlier, I also analyze a number of variables that previous research has shown to influence the availability of credit to privately held companies. I do so because bank loans dominate the capital structure of such firms. For instance, Cole, Wolken, and Woodburn (1996) report that small businesses obtain more than 60% of their credit from banks.

First, I include a number of variables that provide information about the firm’s primary owner—age, ethnicity, gender, and race; as well as ownership percentage and status as the firm’s founder. As previously noted, numerous studies have found that minority-owned firms are more likely than nonminority firms to be denied credit by lenders. If such firms are consistently denied credit based upon nonfinancial factors, then I should observe lower leverage ratios at minority-owned firms. I include dummy variables for Asian-, Black-, Female- and Hispanic-controlled firms to test this proposition.

I include the percentage ownership of the primary owner because ownership of private companies is extremely concentrated, and owners often have much of their personal wealth invested in their companies. Undiversified owners should be more risk averse than diversified owners, so I expect a negative relation between firm leverage and the percentage of ownership.

I include founder status because a number of previous studies (e.g., Mishra and McConaughy, 1999; McConaughy et al., 2001; Villalonga and Amit, 2006) have found that founder-controlled firms use less debt, which they attribute to the founder’s large and undiversified investment in the firm. I expect a negative relation between leverage and founder control.

Second, I include variables that measure the number of financial institutions from which the firm obtains financial services. As previously noted, the literature on lending relationships has established that firms having preexisting relationships with financial institutions are more likely to be granted credit than other firms. Therefore, the more financial institutions with which a firm has relationships, the more credit it should be able to obtain and the higher its leverage

ratio should be. However, other researchers, such as Bulow and Shoven (1978), hypothesize that lenders want exclusive relationships with their borrowers so that they can extract monopoly rents. Cole (1998, 2009) finds that firms with multiple relationships are more likely to be denied credit when they apply for a loan. If this is the case, then firms with more relationships should be able to obtain less credit than other firms and, consequently, have lower leverage ratios.

I use four dummy variables to measure the number of financial institutions: 1) indicators for firms with exactly one commercial bank relationship, 2) for firms with multiple commercial bank relationships, 3) for firms with exactly one nonbank relationship, and 4) for firms with multiple nonbank relationships. The omitted categories are firms with no commercial bank relationships and firms with no nonbank relationships. I use this set of indicators in place of the actual number of relationships because about 60% of all firms have exactly one bank relationship and about 30% of all firms have exactly one nonbank relationship. Nonbank financial institutions typically are finance companies, leasing companies, or, most often, thrift institutions.

Third, I include a set of three dummy variables constructed from the firm's most recent borrowing experience. Cole (2009) uses a firm's most recent borrowing experience to classify a firm into one of four mutually exclusive categories: 1) firms with no need for credit, 2) firms that need credit, but are discouraged from applying; and firms that need credit, applied for credit, and either were 3) approved credit, or 4) denied credit. I hypothesize that management of a "no-need" firm follows a lower risk capital structure, whereas management of a "need-credit" firm follows a higher risk capital structure. In addition, within "need-credit" firms, management of "discouraged" firms and "denied" firms follow higher risk capital structures than do "approved" firms.

Fourth, I include a dummy variable indicating that the firm has limited liability because its owners have chosen a corporation as its legal form of organization. Using data from the four SSBFs, Herranz, Krasa, and Villamil (2009) report that firms with limited liability consistently use more leverage than unlimited liability firms. I hypothesize that risk-averse firm owners will choose lower levels of leverage when they are personally liable for the firm's debts, so I expect a positive relation between leverage and legal liability. Alternatively, Robb and Robinson (2010) argue that loans to corporations usually require personal guarantees of repayment by the owner(s); if true, then limited liability would not make any difference to risk-averse owners and I would expect no relation between leverage and limited liability.

Finally, I include a set of four dummy variables related to the firm's use of trade credit and credit cards. In the pecking order of small firm financing, credit-card debt and trade-credit debt are the most expensive forms of financing and should be used only as a last resort when access to bank debt has been exhausted. Alternative theories of trade credit posit that trade credit can be either a substitute or a complement to bank credit. If trade credit is a complement, then I expect a positive relation between leverage and the use of trade credit; if trade credit is a substitute, then I expect no relation between leverage and trade credit.

Similarly, the use of credit cards to finance business expenses can be a complement or substitute for other types of bank loans. If credit cards are a complement, then I expect a positive relation between leverage and use of credit cards; if they are used as a substitute, then I expect no relation between leverage and use of credit cards.

Last, I construct indicators for whether or not the firm pays off its credit card and trade-credit balances in full each month, or rolls over its balances from month to month. Balances that are not paid off each month accrue finance charges that typically are much higher than bank debt, so that these forms of credit are among the most expensive and are the most likely to be avoided. The pecking-order framework implies a positive relation between leverage and these two indicators.

II. Data and Methodology

A. Data

To conduct this study, I utilize data from four independent, cross-sectional surveys of privately held US firms conducted for the US Federal Reserve Board and US Small Business Administration: the 1987, 1993, 1998, and 2003 SSBF.¹⁰ In each survey, the firms surveyed constitute a nationally representative sample of small businesses operating in the United States as of year-end 1987, 1993, 1998, and 2003, where a small business is defined as a nonfinancial, nonfarm enterprise employing fewer than 500 full-time equivalent employees. The survey data are broadly representative of approximately five million firms operating in the United States as of each survey year. In each survey, there are a very small number of firms that indicated they were publicly traded. I exclude these firms so that my samples contain only privately held firms. I also exclude a small number of firms that reported zero assets or, for 2003, reported no information on a primary owner because they were diffusely owned.¹¹ My final samples for 1987, 1993, 1998, and 2003 are 3,208, 4,601, 3,479, and 4,074, respectively.

Data from the various iterations of the SSBF have been used in a number of highly cited studies that have appeared in the top financial economics journals, including Petersen and Rajan (1994, 1995, 1997, 2002), Berger and Udell (1995, 1998), Cole (1998), Ang et al. (2000), Black and Strahan (2002), Blanchflower et al. (2003), Cole et al. (2004), Bitler, Moskowitz, and Vissing-Jorgensen (2005), Chakravarty and Yilmazer (2009), and Rice and Strahan (2010).

The SSBFs provide detailed information about each firm's balance sheet and income statement; its credit history and use of financial services and institutions; the firm's characteristics including the SIC, organizational form (proprietorship, partnership, or corporation); and demographic characteristics of each firm's primary owner including age, race, ethnicity, and gender.¹² With the exception of the 1987 survey, the SSBFs also provide information regarding the primary owner's age, education, experience, and credit history. Balance sheet and income-statement data are derived from the enterprise's year-end financial statements. Credit history, firm characteristics, and demographic characteristics of each firm's primary owner are taken as of year-end. Each analysis variable used in this study is defined in Table I.

I utilize two alternative book-value measures of capital structure in this study: 1) the ratio of total loans to total assets and 2) the ratio of total liabilities to total assets. I am forced to rely upon book-value measures because the market value of equity is unobservable for privately held firms. The ratio of total liabilities to total assets maps one-to-one with the ratio of debt-to-equity; hence, it corresponds to the traditional measure of leverage that is the focus of most textbook discussions of capital structure. However, total liabilities include current liabilities, which may be viewed as essential to doing business and, therefore, outside of the manager's capital-structure decisions. Therefore, I also analyze the ratio of total loans to total assets, which, for my firms,

¹⁰ See Cox, Elliehausen, and Wolken (1989), Cole and Wolken (1995), Bitler, Robb, and Wolken (2001), and Mach and Wolken (2006) for detailed descriptions of the 1987, 1993, 1998, and 2003 surveys, respectively. Also, see the SSBF codebooks, methodology reports, and questionnaires available at <http://www.federalreserve.gov/pubs/oss/oss3/nssbftoc.htm>.

¹¹ I exclude 15, 32, 10, and 9 publicly traded firms from the 1987, 1993, 1998, and 2003 SSBFs, respectively, so that my sample consists solely of privately held firms. I exclude one firm from the 1987 SSBF, four firms from the 1993 SSBF, 72 firms from the 1998 SSBF, and 77 firms from the 2003 SSBF because they reported zero assets. I exclude an additional 78 firms from the 2003 SSBF that did not provide information on a primary owner because they were diffusely held with no owner controlling at least 10% of the firm. Finally, I exclude two 2003 firms because they were reported as being in SIC 90, which was supposedly excluded from the survey.

¹² I combine S Corporations, C Corporations, and LLCs into the single category "Corporation," and I combine Partnerships and LLPs into the single category "Partnership."

Table I. Variables Used to Explain Capital Structure at Privately Held Firms

This table presents definitions for the variables used in this study. Data are taken from the 1987, 1993, 1998, and 2003 Surveys of Small Business Finances (SSBFs). Additional information on these variables and their components is available from the SSBF codebooks available at: <http://www.federalreserve.gov/pubs/oss/oss3/nssbftoc.htm>.

Firm Characteristics	
Loans to assets	Ratio of total loans to total assets
Liabilities to assets	Ratio of total liabilities to total assets
Corporation	Legal form or organization is corporation
Partnership	Legal form of organization is partnership
Proprietorship	Legal form of organization is proprietorship
Firm age	Number of years since firm was founded or purchased
Total assets (\$000)	Total assets
Sales (\$000)	Annual sales revenues
Total employment	Total full-time equivalent employment
Sales growth positive	Sales growth is positive
Profits positive	Profits are positive
Return on assets	Ratio of net income to total assets
Cash to assets	Ratio of cash to total assets
Tangible assets to assets	Ratio of fixed and depreciable assets to total assets
Firm has been delinquent	Firm was at least 60 days delinquent on a business obligation
Construction	SIC 10 to 19
Primary manufacturing	SIC 20 to 29
Secondary manufacturing	SIC 30 to 39
Transportation	SIC 40 to 49
Wholesale trade	SIC 50 to 51
Retail trade	SIC 52 to 59
Insurance and real estate	SIC 60 to 69 (excludes financial firms)
Business services	SIC 70 to 79
Professional services	SIC 80 to 89
Owner Characteristics	
Founder	Primary owner is firm's founder
Owns 100% of firm	Primary owner owns 100% of the firm
Ownership share	Ownership share of primary owner
Owner age	Age of primary owner
Owner experience	Experience in years of primary owner
Owner is college grad	Primary owner is a college graduate
Owner is female	Primary owner is female
Owner is Black	Primary owner is African-American
Owner is Asian	Primary owner is Asian
Owner is Hispanic	Primary owner is Hispanic
Owner has been delinquent	Primary owner has been at least 60 days delinquent on a personal obligation
Financing Characteristics	
Number of financial institutions	Number of financial institutions with which firm has relationship
Zero financial institutions	Firm has relationship with no financial institutions
One financial institutions	Firm has relationship with exactly one financial institution
Multiple financial institutions	Firm has relationship with more than one financial institution
Number of commercial banks	Number of commercial banks with which firm has relationship

(Continued)

**Table I. Variables Used to Explain Capital Structure at Privately Held Firms
(Continued)**

Financing Characteristics	
Zero commercial banks	Firm has relationship with no commercial banks
One commercial bank	Firm has relationship with exactly one commercial bank
Multiple commercial bank	Firm has relationship with more than one commercial bank
Number of nonbanks	Number of nonbanks with which firm has relationship
Zero nonbanks	Firm has relationship with no nonbanks
One nonbank	Firm has relationship with exactly one nonbank
Multiple nonbanks	Firm has relationship with more than one nonbank
Firm uses credit cards	Firm uses credit cards for financing the business
Firm rolls CC balance	Firm does not pay off its credit card balance in full each month
Firm uses trade credit	Firm uses trade credit for financing the business
Firm paid late on trade credit	Firm paid late on trade credit obligations
Firm had no need for credit	Firm indicated that it had no need for credit during the previous three years
Firm was discouraged	Firm indicated that it was discouraged from applying for credit during the previous three years
Firm was extended credit	Firm indicates that it applied for and was extended credit during previous three years
Firm was denied credit	Firm indicates that it applied for and was denied credit during previous three years.

is essentially total liabilities less current liabilities, divided by total assets. Total loans include both short-term and long-term loans, including utilized lines of credit.¹³ In practice, these two measures of leverage are highly correlated in each of the four SSBFs so that the results obtained using each measure are quite similar.¹⁴

Frank and Goyal (2008) enumerate four major problems faced by empirical researchers doing cross-sectional studies of capital structure: 1) how to define leverage (market vs. book), 2) how to treat panel data, 3) how to deal with missing values, and 4) how to deal with outliers. Because I am analyzing privately held firms, I have only book values of debt and equity; market values do not exist for these firms. Also, I do not have panel data, so I do not have to worry about panel-data issues, such as lack of independence across observations. Of course, this also severely restricts my ability to deal with dynamic versions of the capital-structure theories that have received much attention in the recent literature (e.g., Welch, 2004; Flannery and Rangan, 2006; Strebulaev, 2007; Lemmon, Roberts, and Zender, 2008; Huang and Ritter, 2009). With respect to missing values, I am fortunate that Federal Reserve Board staff already has imputed missing values, primarily using a randomized regression model. I rely upon their expert and well-documented efforts.¹⁵

¹³ Although information on the average maturity of each firm's loan portfolio is not available, I can estimate the average maturity of the most recent loan obtained by each firm in each survey, which is in the range of three to five years.

¹⁴ Welch (2010) critiques three common flaws in empirical capital structure research, one of which is the use of the debt-to-asset ratio as a measure of leverage. He writes, "The financial debt-to-asset ratio is flawed as a measure of leverage because the converse of financial debt is not equity. This is because most of the opposite of the financial debt-to-asset ratio is the *nonfinancial liabilities*-to-asset ratio. This problem is easy to remedy—researchers should use a debt-to-capital ratio or a liabilities-to-asset ratio." He goes on to say that flawed measures of leverage may be acceptable if they are highly correlated with correct measures. The correlations of the two leverage measures used in this study are greater than 0.80, which presumably is "high enough."

¹⁵ Each variable with missing values is modeled as a function of a large number of other survey variables, and a variance-covariance matrix is calculated for this model using all available pairwise observations for which there

With respect to outliers, I have chosen to winsorize problematic variables including each of my financial ratios. This involves replacing values outside of some percentile (typically, the 95th or 99th) with the value at that percentile.¹⁶

I also utilize annual financial data on publicly traded firms from Compustat, extracting data from 1987, 1993, 1998, and 2003.¹⁷ For comparison purposes, I calculate median leverage ratios by year and by one- and two-digit standard industrial classifications.

B. Methodology

To provide new evidence regarding the determinants of capital structure at small firms, I employ both univariate and multivariate techniques. First, I calculate and analyze descriptive statistics (primarily the means and medians) for alternative measures of capital structure by selected firm and owner characteristics. Second, I estimate a weighted-least-squares regression model of the form:

$$\text{Leverage} = f(\text{firm characteristics, financing characteristics, primary owner characteristics}). \quad (1)$$

Firm characteristics, financing characteristics, and primary owner characteristics are defined in Section I.D above.

Each of the four SSBFs is a stratified random sample, so that each observation is associated with a particular sampling weight. To obtain coefficients that can be used to make inferences about the target population rather than only to the sample, one must incorporate these sampling weights into any analysis of the SSBF data; hence, I use weighted-least-squares regression.

III. Results

A. Univariate Results

In Table II, I present the median leverage ratios for my four SSBF samples and, for comparison, for Compustat firms in the same years as the SSBFs. In Table III, I present the median and mean for each of my analysis variables across each of the four SSBFs. Additional descriptive statistics (standard error, minimum, and maximum) for continuous variables appear in Appendix Table AI.

1. Median Leverage: SSBF versus Compustat

As shown in Panel A of Table II, the median leverage of SSBF firms, as measured by the ratio of loans to assets, rose from 17.7% in 1987 to a high of 25.0% in 1993 before falling to 9.4% in

is reported data. This matrix is then used to calculate a unique regression equation for each missing observation based upon available reported data for that observation. For a more detailed explanation, see Kennickell (1991) and the codebooks for each of the four SSBFs, which are available from the Federal Reserve Board's website at: <http://www.federalreserve.gov/pubs/oss/oss3/nssbftoc.htm>.

¹⁶ Both measures of leverage are winsorized at the 95% percentile values, while ROA, the ratio of cash to assets and the ratio of tangible assets to assets, are winsorized at the 99% percentile values.

¹⁷ I select all active firms in each year with total assets (DATA6) greater than zero and employment (DATA29) greater than zero. For consistency with the SSBF, I delete firms in two-digit SIC codes less than 10, in codes 43, 60, 61, 62, 63, 67, and 86 and in codes greater than 89. (The SSBFs exclude firms in these industries.) I calculate the ratio of liabilities to assets as total liabilities (DATA181) divided by total assets (DATA6). I calculate the ratio of loans to assets as the sum of long-term debt (DATA9) and short-term debt (DATA34) divided by total assets (DATA6). I calculate the ratio of tangible assets to total assets as gross property, plant and equipment (DATA7) divided by total assets (DATA6).

Table II. Capital Structure by One-Digit Standard Industrial Classification

For each survey year, the first column presents the median ratios for all Compustat firms, the second column presents the median ratios for Compustat firms with fewer than 500 employees, and the third column presents the weighted median ratio for all SSBF firms. At the bottom of the table, for each year (in italics), are the correlations of each of the one-digit median leverage ratios of the two samples of public firms with that of SSBF private firms. Panel A presents results for the ratio of total loans to total assets, while Panel B reports the results for the ratio of total liabilities to total assets.

Panel A. Median Ratio of Total Loans to Total Assets											
SIC Industry	1987			1993			1998			2003	
	Compustat	Compustat <500 Emp	SSBF	Compustat	Compustat <500 Emp	SSBF	Compustat	Compustat <500 Emp	SSBF	Compustat	Compustat <500 Emp
All firms	0.255	0.201	0.177	0.211	0.133	0.250	0.222	0.114	0.094	0.211	0.113
1 Construction	0.215	0.158	0.126	0.192	0.133	0.199	0.276	0.222	0.133	0.234	0.168
2 Primary manufacturing	0.216	0.106	0.183	0.166	0.089	0.317	0.208	0.073	0.122	0.214	0.207
3 Secondary manufacturing	0.209	0.190	0.233	0.170	0.104	0.225	0.185	0.083	0.161	0.163	0.108
4 Transportation	0.360	0.342	0.215	0.348	0.341	0.348	0.357	0.315	0.320	0.341	0.264
5.1 Wholesale trade	0.286	0.300	0.189	0.277	0.238	0.200	0.256	0.135	0.160	0.239	0.109
5.2 Retail trade	0.255	0.217	0.192	0.202	0.227	0.276	0.218	0.224	0.102	0.189	0.138
6 Financial services	0.300	0.428	0.293	0.192	0.258	0.366	0.303	0.277	0.209	0.216	0.054
7 Business services	0.185	0.194	0.215	0.119	0.064	0.245	0.111	0.069	0.017	0.114	0.027
8 Professional services	0.238	0.154	0.082	0.238	0.204	0.243	0.201	0.145	0.027	0.184	0.000
Correlation with SSBF	0.31	0.68	—	0.20	0.46	—	0.87	0.68	—	0.71	—

(Continued)

Table II. Capital Structure by One-Digit Standard Industrial Classification (Continued)

Panel B. Median Ratio of Total Liabilities to Total Assets												
SIC Industry	1987			1993			1998			2003		
	Compustat	Compustat <500 Emp	SSBF	Compustat	Compustat <500 Emp	SSBF	Compustat	Compustat <500 Emp	SSBF	Compustat	Compustat <500 Emp	SSBF
All firms	0.565	0.476	0.393	0.538	0.484	0.473	0.379	0.435	0.347	0.447	0.565	0.273
1 Construction	0.539	0.414	0.372	0.475	0.357	0.488	0.522	0.450	0.421	0.515	0.461	0.325
2 Primary manufacturing	0.510	0.347	0.362	0.477	0.297	0.554	0.505	0.302	0.468	0.521	0.341	0.357
3 Secondary manufacturing	0.491	0.424	0.432	0.465	0.379	0.507	0.463	0.356	0.409	0.469	0.377	0.371
4 Transportation manufacturing	0.625	0.603	0.313	0.648	0.624	0.622	0.661	0.649	0.619	0.689	0.652	0.343
5.1 Wholesale trade	0.590	0.514	0.489	0.610	0.612	0.531	0.556	0.469	0.450	0.608	0.598	0.416
5.2 Retail trade	0.549	0.491	0.410	0.480	0.452	0.458	0.520	0.514	0.357	0.503	0.566	0.333
6 Financial services	0.625	0.641	0.517	0.578	0.579	0.500	0.625	0.621	0.378	0.635	0.640	0.237
7 Business services	0.498	0.471	0.430	0.471	0.454	0.462	0.486	0.436	0.246	0.529	0.534	0.195
8 Professional services	0.571	0.461	0.208	0.527	0.399	0.430	0.557	0.555	0.238	0.555	0.542	0.182
Correlation with SSBF	0.01	0.29	–	0.59	0.39	–	0.47	0.12	–	–0.03	–0.24	–

Table III. Descriptive Statistics for Variables Used to Explain Capital Structure at Privately Held Firms

This table presents the median and mean for each analysis variable calculated from each of the four Surveys of Small Business Finances (1987, 1993, 1998, and 2003). Variables are defined in Table I.

Year Observations	1987 3,208		1993 4,601		1998 3,479		2003 4,074	
Variable	Median	Mean	Median	Mean	Median	Mean	Median	Mean
<i>Firm characteristics</i>								
Loans to assets	0.177	0.311	0.250	0.352	0.094	0.399	0.073	0.381
Liabilities to assets	0.393	0.477	0.473	0.560	0.347	0.757	0.273	0.581
Corporation	1	0.514	0	0.487	0	0.436	0	0.472
Partnership	0	0.082	0	0.080	0	0.069	0	0.085
Proprietorship	0	0.404	0	0.433	0	0.487	0	0.443
Firm age	10	13.299	11	14.279	11	13.395	12	14.323
Total assets (\$000)	160	752	88	596	65	480	71	537
Sales (\$000)	405	2,008	242	1,254	181	1,133	200	1,050
Total employment	4	11,073	3	8,374	3	8,717	3	8,491
Sales growth positive	1	0.523	1	0.702	1	0.663	0	0.410
Profits positive	1	0.728	1	0.728	1	0.796	1	0.756
Return on assets	0.207	0.556	0.213	0.689	0.333	1.219	0.291	1.086
Cash to assets	0.085	0.162	0.108	0.196	0.117	0.244	0.124	0.257
Tangible assets to assets	0.412	0.443	0.700	0.656	0.280	0.370	0.320	0.395
Firm has been delinquent	n/a	n/a	0	0.190	0	0.136	0	0.158
Construction	0	0.132	0	0.142	0	0.119	0	0.117
Primary manufacturing	0	0.042	0	0.039	0	0.038	0	0.031
Secondary manufacturing	0	0.049	0	0.041	0	0.047	0	0.041
Transportation	0	0.029	0	0.028	0	0.037	0	0.039
Wholesale trade	0	0.100	0	0.085	0	0.073	0	0.060
Retail trade	0	0.264	0	0.217	0	0.193	0	0.186
Insurance and real estate	0	0.069	0	0.071	0	0.064	0	0.070
Business services	0	0.183	0	0.211	0	0.246	0	0.250
Professional services	0	0.133	0	0.166	0	0.183	0	0.206
<i>Owner characteristics</i>								
Founder	1	0.727	1	0.749	1	0.781	1	0.788
Owns 100% of firm	1	0.586	1	0.609	1	0.691	1	0.604
Ownership share (%)	n/a	n/a	100	81.083	100	84.826	100	81.561
Owner age	n/a	n/a	48	49.397	50	50.159	51	51.594
Owner experience	n/a	n/a	17	18.871	16	18.221	20	19.727
Owner is college grad	n/a	n/a	0	0.465	0	0.486	1	0.501
Owner if female	0	0.138	0	0.206	0	0.237	0	0.260
Owner is Black	0	0.023	0	0.029	0	0.040	0	0.039
Owner is Asian	0	0.028	0	0.035	0	0.043	0	0.045
Owner is Hispanic	0	0.019	0	0.043	0	0.057	0	0.043
Owner has been delinquent	n/a	n/a	0	0.135	0	0.124	0	0.120
<i>Financing characteristics</i>								
Number of financial institutions	2	2.043	2	2.106	2	2.063	2	2.408
Zero financial institution	0	0.011	0	0.028	0	0.025	0	0.025
One financial institution	0	0.412	0	0.394	0	0.407	0	0.290
Multiple financial institutions	1	0.577	1	0.579	1	0.567	1	0.685
Number of commercial banks	1	1.317	1	1.262	1	1.226	1	1.243
Zero commercial banks	0	0.057	0	0.097	0	0.112	0	0.123
One commercial bank	1	0.661	1	0.633	1	0.631	1	0.595
Multiple commercial banks	0	0.282	0	0.270	0	0.257	0	0.282

(Continued)

Table III. Descriptive Statistics for Variables Used to Explain Capital Structure at Privately Held Firms (*Continued*)

Year	1987		1993		1998		2003	
Observations	3,208		4,601		3,479		4,074	
Variable	Median	Mean	Median	Mean	Median	Mean	Median	Mean
Number of nonbanks	0	0.726	1	0.843	1	0.837	1	1.165
Zero nonbanks	1	0.522	0	0.494	0	0.492	0	0.356
One nonbank	0	0.314	0	0.299	0	0.297	0	0.330
Multiple nonbanks	0	0.164	0	0.207	0	0.210	0	0.314
Firms uses credit cards	n/a	n/a	1	0.542	1	0.685	1	0.776
Firms rolls CC balance	n/a	n/a	0	0.135	0	0.162	0	0.228
Firm uses trade credit	1	0.834	1	0.639	1	0.629	1	0.607
Firm paid late on trade credit	0	0.420	0	0.364	0	0.270	0	0.247
Firm had no need for credit	n/a	n/a	1	0.516	1	0.609	1	0.559
Firm was discouraged from borrowing	n/a	n/a	0	0.148	0	0.157	0	0.105
Firm was extended credit	n/a	n/a	0	0.271	0	0.178	0	0.293
Firm was denied credit	n/a	n/a	0	0.065	0	0.056	0	0.044

1998 and 7.3% in 2003. When measured by the ratio of liabilities to assets (Panel B of Table II), the median leverage of SSBF firms rose from 39.3% in 1987 to a high of 47.3% in 1993 before falling to 34.7% in 1998 and 27.3% in 2003. It is not surprising that the highest leverage ratios were observed during the “credit crunch” that was ongoing at the time of the 1993 SSBF, just after the recession of 1991-1992. At the time, many observers suggested that small firms were disproportionately impacted, but there was little in the way of substantive analysis because of the lack of data. This led bank regulators to begin collecting information on small business loans in 1992. For example, Hancock and Wilcox (1998) write, “Banks reduced the total supply of bank credit after loan losses around 1990 reduced their capital” and that “such a “capital crunch” on banks might impinge with particular force on small business.”

For comparison, I calculate the median leverage ratios for all Compustat firms and for Compustat firms with fewer than 500 employees. These comparisons give us an idea of how similar or different are the leverage ratios of public and privately held companies. For all public firms, the loan-to-asset ratio (shown in Panel A of Table II) declined from 25.5% in 1987 to 21.1% in 1993, rose to 22.2% in 1998, and fell back to 21.1% in 2003; the liabilities-to-asset ratio (shown in Panel B of Table II) declined from 56.5% in 1987 to 53.8% in 1993 and 37.9% in 1998 before rising to 44.7% in 2003. For small public firms, the loan-to-asset ratio (shown in Panel A of Table II) declined from 20.1% in 1987 to 13.3% in 1993, 11.4% in 1998, and 11.3% in 2003; the liabilities-to-asset ratio (shown in Panel B of Table II) rose from 47.6% in 1987 to 48.4% in 1993, fell to 43.5% in 1998, and then peaked at 56.5% in 2003.

These statistics indicate that privately held firms, in general, employ a comparable degree of leverage relative to small publicly traded firms when leverage is measured by the ratio of loans to assets, but employ less leverage when leverage is measured by the ratio of total liabilities to total assets. This finding is quite different from Brav (2009), who reports that in the United Kingdom, private firms use much more leverage than do public firms (median debt-to-asset ratio of 27.5% for private firms vs. 19.9% for public firms). The statistics also indicate that small public firms employ less leverage than large public firms when leverage is measured by the ratio of loans to total assets; when leverage is measured by total liabilities to total assets, small public firms sometimes use less leverage and sometimes use more leverage than large public firms.

Also shown in Panels A and B of Table II are the leverage ratios by one-digit (SIC). When leverage is measured by the loan-to-asset ratio (Panel A of Table II), the one-digit leverage ratios of public and private firms are highly correlated in most years. The correlation of all Compustat firms with SSBF firms ranges from a low of 0.20 in 1993 to a high of 0.87 in 1998, whereas the correlation of small Compustat firms with SSBF firms ranges from a low of 0.34 in 2003 to a high of 0.68 in both 1987 and 1998. Similar, but quantitatively lower, correlations are observed for leverage ratios measured at the two-digit SIC level.

When measured by the ratio of liabilities-to-assets, I find far lower correlations. As shown in Panel B of Table II, the correlation of all Compustat firms with SSBF firms ranges from a low of -0.03 in 2003 to a high of 0.59 in 1993, while the correlation of small Compustat firms with SSBF firms ranges from a low of -0.24 in 2003 to a high of 0.39 in 1993. For leverage ratios measured at the two-digit SIC level, absolute magnitudes are even smaller. Because the primary difference between the loan-to-asset and liabilities-to-asset ratios is current liabilities, the lower correlations for the latter ratio would appear to be driven by differences in the use of trade credit. Small firms are thought to be far more reliant upon trade credit than large firms.

It is important to note that the median number of employees for these “small” Compustat firms ranges from 99 to 132, whereas the median number of employees for the SSBF firms ranges from 3 to 4. As this comparison makes clear, even the smallest of publicly traded firms are more than an order of magnitude larger than the typical privately held firm.

2. Medians for Explanatory Variables

In Table III, I find that the median size of a SSBF firm (measured in real 2003 dollars) ranges from \$65,000 to \$160,000 in terms of total assets, from \$181,000 to \$405,000 in terms of annual sales revenues, and, as previously noted, between 3 and 4 in terms of total employment. In general, firm size declined from 1987 to 1993 and from 1993 to 1998, but rose from 1998 to 2003.

Median firm age increased from 10 years in 1987 to 11 years in 1993 and 1998 and to 12 years in 2003. Profitability, as measured by ROA, varied from a low of 20.7% in 1987 to a high of 33.3% in 1998. Liquidity, as measured by the ratio of cash to total assets, ranged from 8.5% in 1987 to a high of 12.4% in 2003. Tangible assets, as measured by the ratio of inventory plus plant, property, and equipment to total assets, ranged from 28.0% in 1998 to 65.6% in 1993.

Median ownership share of the primary owner is 100% in all four years indicating that over half of the firms have a single owner. This is not surprising because more than 40% of the firms are proprietorships, which, by definition, have only one owner. When I calculate this percentage for corporations, I find that one-in-four to one-in-three have only a single shareholder with 100% ownership. Median owner age is from 48 to 51 years and median owner experience is from 16 to 20 years. Among the financing characteristics, the median number of both commercial banks and nonbanks is one; thus, the median number of financial institutions is two. For the remainder of the variables, which are zero-one indicator variables, the medians are not informative relative to the means. I will discuss them below.

3. Means of Explanatory Variables

Also provided in Table III is the mean for each variable. The means for firm leverage, size, profitability, and liquidity are much larger than the corresponding medians. This is evidence of the substantial skewness in these distributions.

Average firm size ranges from \$480,000 in 1998 to \$752,000 in 1987 when measured by total assets, from \$1.05 million in 2003 to \$2.01 million in 1987 when measured by annual sales, and from 8.4 in 1993 to 11.1 in 1987 when measured by total employment. Average profitability as

measured by net income to assets varied from 55.6% in 1987 to 122% in 1998. The percentage of firms that were profitable ranged from 72.8% in 1987 and 1993 to 79.6% in 1998. Average liquidity as measured by the ratio of cash to assets was between 16.2% in 1987 and 25.7% in 2003. Average tangible assets ranged from 37.0% in 1998 to 65.6% in 1993. Credit quality, as proxied by my indicator for firms that reported delinquencies on business obligations, was worst in the recession year of 1993 at 19.0% of all firms, and best in the expansion year of 1998 at 13.6%. This measure was not collected during the 1987 survey.

The distribution of firms by one-digit SIC indicates some marked changes from 1987-2003. The percentage of firms in business services rose from 18.3% to 25.0%, while the percentage of firms in professional services rose from 13.3% to 20.6%. In contrast, the percentage of firms in retail trade dropped from 26.4% to 18.6% and the percentage of firms in wholesale trade dropped from 10.0% to 6.0%.

Among my primary owner characteristics, I find that about three in four owners are firm founders. Average ownership is in the range of 81% to 85%. Average owner age is approximately 50 years and average owner experience is just under 20 years. Approximately half of the owners have at least a college degree. About one in eight owners reported that they were delinquent on a personal obligation. Owner age, experience, education, ownership share, and creditworthiness were not collected for the 1987 survey.

Ownership by minorities increased significantly from 1987 to 2003 period covered by the four surveys. Female ownership rose in each survey year from 13.8% in 1987 to 26.0% in 2003. Black ownership rose from 2.3% in 1987 to a peak of 4.0% in 1998 before declining to 3.9% in 2003. Asian ownership rose in each survey year from 2.8% in 1987 to 4.5% in 2003. Hispanic ownership rose from 1.9% in 1987 to a high of 5.7% in 1998 before declining to 4.3% in 2003.¹⁸

Among my financing characteristics, I find that less than 3% of the firms have no relationship with financial institutions, while 57% to 68% have relationships with multiple financial institutions. The average number of relationships with financial institutions is just over two for the first three surveys, but rose to 2.4 in 2003. Note that 6% to 12% of the firms have no relationship with commercial banks, while just over one in four have multiple bank relationships. About two in three have exactly one bank relationship. The average number of banks is about 1.3. Approximately half of firms have no relationship with nonbanks, but this figure declined to about one in three firms for 2003. The percentage of firms with multiple nonbank relationships rose in each year from 16% in 1987 to 31% in 2003. The average number of nonbank relationships rose from 0.73 in 1987 to 1.16 in 2003.

Use of credit cards to finance business expenses rose from 54% in 1993 to 78% in 2003, and the percentage of firms that did not pay off their entire balance each month rose from 13% in 1993 to 23% in 2003. The 1987 survey did not collect information regarding the use of credit cards.

The use of trade credit declined in each successive survey from 83% in 1987 to 61% in 2003. This likely reflects the changing industry composition, where I found a shift from retail and wholesale trade to business and professional services. Firm credit quality, as measured by the percentage of firms paying late on trade credit, improved each year from 42% in 1987 to 25% in 2003, but this decline may simply reflect the declining use of trade credit. You can't be late if you don't use it.

Finally, the percentage of firms reporting that they did not have a need for new credit during the previous three years is lowest in 1993 at 51.6% and highest in 1998 at 60.9%, reflecting the

¹⁸ In this table, owners who are Black and Hispanic are included only in the Black category so that the statistics for Hispanics are biased downward slightly.

Table IV. Median Capital Structure Ratios of Privately Held Firms by Selected Firm and Owner Characteristics

This table presents median capital structure ratios by legal form of organization, by asset size, by firm age, and by the race, ethnicity, and gender of the primary owner. Capital structure is measured by either the ratio of total loans to total assets (“Loans”) or the ratio of total liabilities to total assets (“Liabs”). Data are taken from the 1987, 1993, 1998, and 2003 Surveys of Small Business Finances.

	1987			1993			1998			2003		
	Obs.	Loans	Liabs.	Obs.	Loans	Liabs.	Obs.	Loans	Liabs.	Obs.	Loans	Liabs.
All firms	3,208	0.177	0.393	4,601	0.250	0.473	3,479	0.094	0.347	4,074	0.073	0.273
<i>Legal form</i>												
Proprietorship	1,194	0.051	0.223	1,490	0.195	0.413	1,373	0.000	0.111	1,297	0.000	0.079
Partnership	255	0.245	0.414	337	0.259	0.428	218	0.182	0.400	314	0.141	0.313
Corporation	1,759	0.254	0.502	2,774	0.292	0.551	1,861	0.242	0.548	2,463	0.237	0.507
<i>Asset quartile</i>												
Q1 (Smallest)	802	0.000	0.219	1,153	0.195	0.500	872	0.000	0.025	1,019	0.000	0.059
Q2	805	0.182	0.357	1,159	0.255	0.448	869	0.136	0.381	1,018	0.118	0.273
Q3	799	0.240	0.446	1,158	0.266	0.457	869	0.184	0.414	1,020	0.214	0.378
Q4 (Largest)	802	0.273	0.544	1,131	0.266	0.512	869	0.215	0.436	1,017	0.194	0.438
<i>Firm age</i>												
0 to 5 years	851	0.299	0.529	948	0.362	0.563	889	0.093	0.421	809	0.141	0.450
6 to 10 years	736	0.187	0.414	1,140	0.279	0.499	706	0.161	0.414	785	0.128	0.315
11 to 20 years	921	0.177	0.372	1,426	0.233	0.459	1,048	0.108	0.348	1,213	0.060	0.251
21+ years	700	0.055	0.235	1,087	0.181	0.397	836	0.022	0.219	1,267	0.030	0.197
<i>Race/ethnicity</i>												
Asian	60	0.144	0.367	305	0.242	0.452	199	0.036	0.213	165	0.111	0.386
Black	53	0.084	0.193	441	0.204	0.471	259	0.027	0.185	119	0.000	0.240
Hispanic	48	0.211	0.471	290	0.222	0.434	243	0.046	0.271	145	0.018	0.229
White	2,973	0.188	0.400	3,528	0.254	0.478	2,739	0.098	0.362	3,612	0.074	0.273
Other	74	0.091	0.273	37	0.237	0.512	39	0.154	0.387	33	0.451	0.709
<i>Gender</i>												
Male	2,807	0.187	0.396	3,764	0.253	0.476	2,719	0.109	0.370	3,187	0.109	0.312
Female	401	0.114	0.346	837	0.224	0.469	760	0.011	0.226	887	0.000	0.169

economic conditions of bust and boom in those years, and fell to 55.9% for 2003. The percentage of discouraged firms rose from 14.8% in 1993 to 15.7% in 1998 and then fell to 10.5% in 2003. The percentage of approved firms was lowest at 17.8% in 1998 and highest at 29.3% in 2003. The percentage of denied firms declined in each year from 6.5% in 1993 to 5.6% in 1998 and 4.4% in 2003. Information on recent credit applications was not collected by the 1987 survey.

4. Leverage by Selected Firm and Owner Characteristics

In Table IV, I present median leverage ratios broken out by selected firm and owner characteristics. When broken down by organizational form, I find that Proprietorships use far less leverage than do any of the organizational forms that enjoy limited liability. This is not surprising as proprietors are personally liable for the liabilities of their firms, whereas the owners of corporations and partnerships (except for the general partner) are not. It also contradicts Robb and Robinson (2010), who argue that most lenders require personal guarantees on corporate loans,

but is consistent with Avery, Bostic, and Sernolyk (1998), who provide evidence that 60% to 75% of small business loans lack personal guarantees.

The median proprietorship had no loans outstanding in either 1998 or 2003, but borrowed 19.5% of their assets in 1993 during the height of the 1990s “credit crunch.” Corporations had the highest loan-to-asset ratio in every year (25.4% in 1987, 29.2% in 1993, 24.2% in 1998, and 23.7% in 2003). Partnership leverage fell in between that of corporations and proprietorships in each year at 24.5% in 1987, 25.9% in 1993, 18.2% in 1998, and 14.1% in 2003.

When broken down into asset-size quartiles, I see a positive and monotonic relationship between size and leverage, with the smallest firms using the least leverage. The median firm in the smallest quartile reported no loans outstanding except in 1993, when the median was 19.5%. In contrast, the median firm in the largest quartile borrowed loans equal to 19.4% to 27.3% of their assets.

Next, I break down the sample by firm age: 0 to 5 years, 6 to 10 years, 11 to 20 years, and 21-plus years old. These correspond roughly, but not exactly, to the age quartiles. In each survey, I see a negative and monotonic relation between firm age and leverage. The oldest firms report the lowest ratios of loans to assets, while the youngest firms report the highest ratios of loans to assets. There is one exception, in 1998, when the youngest firms reported less leverage than any group except for the 21-plus-year-old firms.

I also break down the samples by race: Asian, Black, White Hispanic, White Non-Hispanic, and Other. In general, minority-owned firms report lower median leverage ratios than White Non-Hispanic firms. This is consistent with the existence of discrimination in the credit markets for small firms, as reported by Cavalluzzo and Cavalluzzo (1998), Cole (1999, 2009), Cavalluzzo et al. (2002), and Blanchflower et al. (2003).

Finally, I break down the samples by gender. Female-owned firms use less leverage than male firms in each year, but these differences are greatest in 1998 and 2003, when female firms used virtually no loans, while male firms used loans equal to 11% of their assets.

Next, I turn to the medians for the ratio of total liabilities to total assets. The results by organizational form, asset size, firm age and race, ethnicity, and gender are qualitatively similar to those reported for the loan-to-asset ratio. Proprietorships use the least amount of leverage, while corporations use the most amount of leverage in each year. I again observe a positive and monotonic relation between firm size and leverage and a negative and monotonic relation between firm age and leverage. Again, I see that leverage is generally lower among minority-owned and female-owned firms.

B. Multivariate Results

Table V presents the results of weighted-least-squares regression analysis based upon the full sample of firms in each survey and where the dependent variable is either the ratio of total loans to total assets or the ratio of total liabilities to total assets.

1. Ratio of Total Loans to Total Assets

Panel A of Table V reports the results for leverage as measured by the ratio of total loans to total assets, where the upper tail of the distribution has been winsorized at the 95th percentile.

a. Firm Characteristics. With respect to firm characteristics, the results are relatively consistent across the four surveys. For many of these variables, the signs are consistent and the coefficients are statistically significant at better than the 0.05 level across each of the four surveys.

The coefficient of the two-digit industry median leverage ratio is positive and highly significant in each year, and ranges from a low of 0.264 in 2003 to a high of 0.605 in 1998. Frank and Goyal

Table V. Determinants of Capital Structure at Privately Held Firms

This table presents the results from a weighted-least-squares regression model where the dependent variable is firm leverage as measured by the ratio of total loans to total assets. Data are taken from the 1987, 1993, 1998, and 2003 Surveys of Small Business Finances. For each explanatory variable, the table presents its regression coefficient ("Coef.") and associated *t*-statistic ("t-Stat"). Explanatory variables are defined in Table I.

<i>Panel A. Leverage as Measured by the Ratio of Total Loans to Total Assets</i>								
	1987		1996		1998		2003	
	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat
Intercept	0.408***	6.31	0.382***	6.88	1.148***	11.60	0.892***	10.92
<i>Firm characteristics</i>								
Industry target leverage	0.466***	6.48	0.594***	11.20	0.605***	7.44	0.264***	4.02
Corporation	0.097***	5.20	0.050***	3.38	0.128***	4.95	0.175***	8.78
Partnership	0.053*	1.74	0.024	1.00	-0.016	-0.34	0.129***	3.69
Log of firm age	-0.062***	-8.09	-0.029***	-3.12	-0.024*	-1.69	-0.050***	-4.31
Log of assets	-0.025***	-5.07	-0.026***	-7.51	-0.091***	-14.57	-0.082***	-14.88
Sales growth positive	-0.010	-0.79	0.008	0.73	0.030	1.44	0.042	2.47
Profits positive	-0.052***	-3.63	-0.042***	-3.69	-0.111***	-4.49	-0.081	-4.16
Cash to assets	-0.225***	-6.35	-0.201***	-8.49	-0.074*	-1.84	-0.053	-1.52
Tangible assets to assets	0.150***	6.53	0.126	6.53	0.087***	2.80	0.206***	7.68
Firm has been delinquent	n/a	n/a	0.014	0.95	0.144***	4.23	0.082***	2.99
<i>Financing characteristics</i>								
One commercial bank	0.126***	4.43	0.107***	5.92	0.185***	5.55	0.087***	3.22
One nonbank	0.109***	7.54	0.082***	6.84	0.163***	7.05	0.157***	7.71
Multiple commercial banks	0.192***	6.35	0.173***	8.54	0.389***	10.10	0.189***	6.19
Multiple nonbanks	0.165***	8.78	0.124***	8.65	0.311***	11.44	0.197***	8.82
Firm uses credit cards	n/a	n/a	-0.003	-0.31	0.025	1.09	-0.014	-0.68
Firm rolls CC balance	n/a	n/a	0.057***	3.50	0.127***	4.41	0.120***	5.49
Firm uses trade credit	-0.016	-0.87	-0.066***	-5.16	-0.032	-1.36	0.015	0.73
Firm paid late on trade credit	-0.057***	4.09	0.020	1.47	0.023	0.85	0.041*	1.75
Firm was discouraged	n/a	n/a	0.086***	5.47	0.185***	6.41	0.131***	4.33
Firm was approved	n/a	n/a	0.115***	8.99	0.137***	4.98	0.211***	10.29
Firm was denied	n/a	n/a	0.087***	3.95	0.049	1.01	0.175***	4.03
<i>Owner characteristics</i>								
Founder	0.006	0.38	-0.001	-0.09	-0.068***	-2.87	-0.095***	-4.58
Owns 100% of firm	-0.011	-0.62	-0.004	-0.29	-0.096***	-3.40	-0.049**	-2.48
Owner age	n/a	n/a	-0.001	-0.86	-0.003***	-2.90	0.002	1.59
Owner experience	n/a	n/a	-0.001	-0.86	0.003**	2.50	0.002	1.51
Owner is college grad	n/a	n/a	0.000	0.00	0.017	0.86	0.036**	2.13
Owner is female	-0.029	-1.57	-0.034***	-2.66	0.020	0.86	-0.073***	-3.76
Owner is Black	-0.068	-1.62	-0.091***	-3.04	-0.084*	-1.70	-0.029	-0.65
Owner is Asian	-0.084**	-2.21	-0.018	-0.67	-0.034	-0.71	0.013	0.33
Owner is Hispanic	-0.055	-1.21	-0.042*	-1.68	-0.062	-0.149	-0.040	-0.98
Owner has been delinquent	n/a	n/a	-0.016	-0.95	-0.020	-0.59	0.049*	1.69
Adjusted R^2	0.151		0.160		0.195		0.185	
Observations	3,208		4,601		3,478		4,074	

(Continued)

Table V. Determinants of Capital Structure at Privately Held Firms (Continued)

<i>Panel B. Leverage as Measured by the Ratio of Total Liabilities to Total Assets</i>								
	1987		1996		1998		2003	
	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat	Coef.	t-Stat
Intercept	0.570***	6.94	0.573***	7.90	2.172***	11.80	1.363***	12.24
<i>Firm characteristics</i>								
Industry target leverage	0.503***	6.81	0.631***	8.63	0.874***	7.52	0.273***	3.50
Corporation	0.148***	6.51	0.124***	7.11	0.215***	4.55	0.308***	11.56
Partnership	0.082**	2.23	0.077***	2.71	0.019	0.22	0.233***	5.02
Log of firm age	-0.077***	-8.28	-0.026**	-2.43	-0.066***	-2.59	-0.058***	-3.77
Log of assets	-0.033***	-5.58	-0.046***	-11.64	-0.170***	-15.05	-0.129***	-17.57
Sales growth positive	0.000	0.02	0.011	0.83	0.021	0.55	0.079***	3.46
Profits positive	-0.094***	-5.40	-0.037***	-2.75	-0.095**	-2.11	-0.111***	-4.26
Cash to assets	0.292***	-6.82	-0.184***	-6.65	-0.176**	-2.40	-0.090*	-1.92
Tangible assets to assets	-0.009	-0.33	0.057**	2.53	-0.178***	-3.17	0.087**	2.43
Firm has been delinquent			0.083***	4.66	-.290***	4.68	0.124***	3.38
<i>Financing characteristics</i>								
One commercial bank	0.153***	4.44	0.105***	4.96	0.290***	4.79	0.130***	3.61
One nonbank	0.106***	6.04	0.055***	4.17	0.236***	5.62	0.216***	7.98
Multiple commercial banks	0.242***	6.59	0.156***	6.57	0.503***	7.20	0.253***	6.21
Multiple nonbanks	0.185***	8.10	0.117***	6.95	0.385***	7.78	0.268***	9.04
Firm uses credit cards	n/a	n/a	-0.014	-1.07	0.084**	2.02	0.001	0.04
Firm rolls CC balance	n/a	n/a	0.029	1.53	0.240***	4.56	0.183***	6.29
Firm uses trade credit	0.025	1.08	-0.037**	-2.45	0.000	-0.01	0.057**	2.12
Firm paid late on trade credit	0.112***	6.61	0.052***	3.28	0.153***	3.18	0.119***	3.78
Firm was discouraged	n/a	n/a	0.109***	5.92	0.274***	5.21	0.198***	4.90
Firm was approved	n/a	n/a	0.107***	7.16	0.197***	3.94	0.238***	8.71
Firm was denied	n/a	n/a	0.125***	4.86	0.256***	2.90	0.249***	4.31
<i>Owner characteristics</i>								
Founder	0.016	0.91	-0.014	-1.03	-0.125***	-2.90	-0.102***	-3.71
Owns 100% of firm	-0.024	-1.07	0.015	0.89	-0.122**	-2.37	-0.050*	-1.93
Owner age	n/a	n/a	0.000	0.05	-0.006***	-2.97	0.002	1.56
Owner experience	n/a	n/a	0.000	-0.06	0.006**	2.44	0.002	1.18
Owner is college grad	n/a	n/a	0.005	0.44	-0.025	-0.70	0.052**	2.27
Owner is female	-0.038*	-1.69	-0.021	-1.42	-0.015	-0.35	-0.105***	-4.03
Owner is Black	-0.107**	-2.10	-0.082**	-2.33	-0.171*	-1.91	-0.029	-0.48
Owner is Asian	-0.050	1.08	-0.015	-0.48	-0.123	-1.43	0.043	0.81
Owner is Hispanic	0.003	0.05	-0.031	-1.07	-0.150**	-1.99	-0.032	-0.60
Owner has been delinquent	n/a	n/a	0.018	0.89	0.060	0.97	0.058	1.48
Adjusted R ²	0.168		0.134		0.180		0.207	
Observations	3,208		4,601		3,478		4,074	

***Significant at the 0.01 level.

**Significant at the 0.05 level.

*Significant at the 0.10 level.

(2008) report that median industry leverage is one of the “core set of six reliable factors that are correlated with cross-sectional differences leverage.” I find that this result also holds for privately held firms. This result also is supportive of the trade-off theory’s prediction of a target leverage ratio.

The coefficient of my indicator for corporations is positive and highly significant in each year. It ranges from 0.050 in 1993 to 0.175 in 2003 indicating that the loan-to-asset ratio is 5.0 to 17.5 percentage points higher at corporations than at the omitted category of proprietorships. The coefficient of my indicator for partnerships is positive in each year except 1998, but is statistically significant only in 1987 and 2003. In general, these results are consistent with the univariate differences reported in Table IV. These findings also are consistent with the limited-liability protection offered by the differing organizational forms; that is, none for proprietorships, limited for partnerships, and full for corporations.

The coefficient of the natural logarithm of firm age is negatively related to firm leverage in each of the four surveys, and the relation is significant at better than the 0.001 level in each year except 1998, when it is only significant at the 0.10 level. This result appears to contradict the TOT, which predicts that older firms should be more highly levered than their younger counterparts.

Firm size, as measured by the natural logarithm of total assets, is inversely related to firm leverage. This relation is significant at better than the 0.001 level in each survey. In other words, larger firms use significantly less debt in their capital structure. However, further investigation reveals that this relation is largely driven by the negative-equity firms in each sample. In the robustness tests reported below, the sign of the firm size coefficient flips from negative to positive in each year (except for 1993) when I restrict my sample to firms reporting positive equity. This restricted-sample result is consistent with the both the TOT and the POT, which predict that larger firms should use more leverage than smaller firms.

Profitability, as measured by an indicator for firms reporting positive profits, demonstrates a consistent negative and significant relation with the loan-to-asset ratio. The coefficients indicate that the loan-to-asset ratio is 4.0 to 11.0 percentage points lower at profitable firms. However, as discussed below, this relation becomes inconsistent when I restrict my sample to positive-equity firms. Further analysis indicates that unprofitable firms are found disproportionately among the negative-equity subsample. Hence, the results are inconclusive with respect to both the TOT, which predicts a positive sign, and the POT, which predicts a negative sign.

Liquidity, as measured by the ratio of cash to total assets, is inversely related to firm leverage in each of the four surveys. This relation is statistically significant at better than the 0.10 level in each survey, except for 2003 when it has a *p*-value of 0.13. The coefficient ranges from –0.05 to –0.22 indicating that a 100 basis point increase in the ratio of cash to assets reduces the ratio of debt to assets by 5 to 22 basis points. This result is inconsistent with the TOT, which predicts that firms with more liquid assets have a lower probability of financial distress and should use more leverage.

Tangibility is positively related to leverage across each of the four surveys and is statistically significant at better than the 0.01 level for each year. The coefficients range from 0.087 to 0.206 indicating that a 100 basis point increase in the tangible asset ratio is associated with a 9 to 21 basis point increase in the loan-to-asset ratio. According to Frank and Goyal (2008), the relation between tangibility and leverage is reliably positive in cross-sectional studies of publicly traded firms. My results for privately held firms are broadly consistent with this finding. This result also is supportive of both the TOT and POT as both predict a positive sign.

Creditworthiness, as measured by the indicator for a firm that has been delinquent on business obligations, is positively related to firm leverage in each of the three surveys for which it is available. The coefficient on this variable is significant at the 0.01 level for 1998 and 2003.

When the indicator variable for Trade Credit Paid Late is removed from the model, the coefficient on the indicator for firm delinquencies is significant at the 0.01 level in 1993, as well. This delinquency variable was not collected in the 1987 survey. The coefficient ranges from 0.014 to 0.144 indicating that the loan-to-asset ratios were 1.4 to 14.4 percentage points higher for such firms. This result also is supportive of the both the TOT and POT, which both predict a positive sign.

The coefficient of the proxy for growth opportunities, which is an indicator for firms reporting positive sales growth, is positive in three of the four surveys, but is statistically significant only in 2003. In robustness tests (not shown), I find similar results when I examine employment growth in place of sales growth. Both the POT and TOT predict a negative relation between leverage and growth opportunities. This suggests that historical sales growth and employment growth are poor proxies for future growth opportunities of my privately held firms.

b. Financing Characteristics. Moving to the financing variables, I find that the loan-to-asset ratio is positively related to both the number of commercial banks and to the number of nonbanks from which the firm obtains financial services. In each of the four surveys, the coefficients on the indicators for firms with one bank, one nonbank, multiple bank and multiple nonbank relationships are positive and significant at better than the 0.001 level.

The coefficients indicate that, relative to a firm that has no relationship with a financial institution, adding one banking relationship increases the loan-to-asset ratio by 9 to 18 percentage points; adding two or more banking relationships increases the loan-to-asset ratio by 17 to 39 percentage points. The inclusion of one nonbank relationship increases the loan-to-asset ratio by 8 to 16 percentage points; adding two or more nonbank relationships increases the loan-to-asset ratio by 12 to 31 percentage points.

Given the importance of relationship lending to small firms documented in the literature, these results are not surprising. Cole (1998), for example, finds that small firms are more likely to be extended credit by a potential lender when there is a preexisting relationship. However, he also finds that small firms are less likely to be extended credit when they have multiple banking relationships. My results suggest that the reduction in the probability of getting a loan from a particular lender is more than offset by increasing the number of potential lenders.

Next, I examine whether the use of credit cards and trade credit is related to leverage. I find no relation between leverage and the use of credit cards to finance business expenses, but I do find that leverage is significantly higher at firms rolling over their credit card balances each month, as opposed to paying them off in full each month. The coefficient on my indicator for these firms shows that the loan-to-asset ratio is 6 to 13 percentage points higher than for firms that pay off their balances in full each month.

I also find no association between leverage and the use of trade credit. The coefficient on my indicator for firms that reported using trade credit is negative in each year except for 2003, but is statistically significant only in 1993. In general, these results suggest that trade credit is a complement to, rather than a substitute for, bank credit; a negative and significant relation would have supported trade-credit theories suggesting that the two are substitutes. However, the negative relation found in 1993 may indicate that trade credit is a substitute for bank credit when bank credit is extremely tight, as it was during the credit crunch of the early 1990s. Meltzer (1960) posits that trade creditors redistribute traditional bank credit during periods of tight money.

The coefficient on my indicator for firms that paid late on trade credit is consistently positive, but is statistically significant in only two of the four surveys (1987 and 2003). However, there is a strong correlation between this variable and the firm delinquency variable; when the delinquency

variable is omitted from the model, the coefficient of the indicator for paid late on trade credit becomes significant in each of the four surveys.

Finally, I examine the firm's recent experience in the credit markets based upon its most recent loan application during the three years prior to each survey. Each of the coefficients on my indicators for firms that reported needing credit during the years prior to the survey is positive and each is highly significant, except for firms that were denied credit in 1998. (The omitted category is firms reporting no need for credit.) Discouraged firms and approved firms were consistently found to use more leverage than no-need firms. The coefficients indicate that firms needing credit had loan-to-asset ratios that were 9 to 21 percentage points higher than firms reporting no need for credit during the years prior to each survey.

c. Owner Characteristics. Surprisingly, none of my primary-owner characteristics turn out to be reliable factors in explaining firm leverage as measured by the loan-to-asset ratio. Coefficients on my indicators for founders and 100% owners are statistically significant only in 1998 and 2003. Coefficients on owner age and experience change signs and attain statistical significance only in 1998. The coefficient on my indicator for owners who are college grads is reliably positive, but is statistically significant only in 2003.

Coefficients for race, ethnicity, and gender of the firm's primary owner are generally negative, but statistically insignificant. Not shown are the results obtained when I replace my indicators for Asian, Black, and Hispanic firms with a single indicator for a minority-owned firm. The coefficient on this variable is negative and significant in each of the four surveys, indicating that minority-owned firms consistently have lower loan-to-asset ratios than white-owned firms.

My final variable is an indicator for creditworthiness of the primary owner. Previous research such as Cole (1998, 2009) has shown that owner creditworthiness is negatively related to the likelihood that a firm will be extended a loan by its prospective lender. The coefficient on my indicator for firms whose owners were delinquent on personal obligations is significant only for 2003 when it is positive; in 1993 and 1998, the coefficient is negative, but insignificant.

2. Results for the Liability-to-Asset Ratio

Panel B of Table V presents weighted-least-squares regression results where leverage is measured by the winsorized ratio of total liabilities to total assets. In general, the results are qualitatively similar to those in Panel A. This is not surprising, as the correlation coefficients for my two measures of leverage are greater than 0.80 in each of the four surveys.

a. Firm Characteristics. Among the firm characteristics, industry target leverage, the indicator for corporations, and the indicator for firms with delinquent business obligations, each shows a consistent positive relation with the liability-to-asset ratio while (log of) firm age, firm size (log of assets), the cash-to-asset ratio, and an indicator for profitable firms each shows a consistent negative relation with the liability-to-asset ratio.

b. Financing Characteristics. Next, I address the financing characteristics. Indicators for the use of one or multiple bank or nonbank relationships, for firms that paid late on trade credit, and for firms that needed credit (discouraged, approved, and denied) during the years prior to the survey show consistently positive relations with the liability-to-asset ratio.

c. Owner Characteristics. Among the primary owner characteristics, none of the variables are consistent predictors of the liability-to-asset ratio. However, an indicator for minority-owned firms constructed by combining indicators for Asian, Black, and Hispanic firms (not shown in the table) has a consistently negative relation with the liability-to-asset ratio.

C. Robustness Tests of Multivariate Results

1. Negative-Equity Firms

One concern regarding my results is the impact of negative-equity firms (where the liability-to-asset ratio is greater than 1.0), which account for between 8% and 22% of each SSBF sample. Descriptive statistics (available from the author upon request) indicate strong and significant differences between positive-equity and negative-equity firms. Negative equity firms are consistently and significantly: 1) smaller as measured by sales and assets, 2) less profitable, 3) more likely to be delinquent on both business and personal obligations, 4) have owners who are younger and less experienced, and 5) have relationships with more financial institutions. Consequently, I rerun my analysis excluding negative-equity firms from the analysis. The results of this analysis appear in Panels A and B of Table VI and show that most of my key findings are robust to this sample exclusion. However, there are two important differences: firm size and profitability become unreliable as predictors of capital structure.

Panel A of Table VI presents the results for the loan-to-asset ratio. Among the firm characteristics, industry target leverage, firm age, and tangible assets remain consistent predictors of leverage. However, the sign on firm size (as measured by the log of assets) flips from negative to positive in three of the four surveys. This suggests that the negative relation between firm size and leverage observed in the full samples is driven primarily by the negative-equity firms in the sample, which are significantly smaller than the positive-equity firms. When they are omitted, I generally find no consistent relation between firm size and equity, in contrast to the positive relation documented in the literature for public firms.

In addition, the coefficient on my profitability indicator loses significance in three of the four surveys when I eliminate negative-equity firms. This is because unprofitable firms are found disproportionately among the negative-equity firms. Finally, the coefficient on the indicator for corporations loses significance in two of the surveys, although it remains consistently positive. This is somewhat surprising because corporations are disproportionately represented among the negative equity firms.

Among the financing characteristics, each of the four indicators for bank and nonbank relationships remains a consistent predictor of leverage, as do the indicators for firms that rolled their credit card balances and for firms that applied for and were approved for new credit during the past three years. Among the owner characteristics, I still find no consistent predictors of leverage unless I pool the three minority indicators for Asian, Black, and Hispanic firms into a single variable.

Panel B of Table VI presents the results for the liability-to-asset ratio when negative equity firms are excluded from the analysis. In general, the results are consistent with those in Panel A of Table VI, with two notable exceptions: the indicator for corporations and the ratio of cash to assets join the consistent predictors of leverage. Corporations use more leverage and more liquid firms use less leverage.

2. Potentially Endogenous Explanatory Variables

There are concerns about potential endogeneity for several of my explanatory variables, including the bank/nonbank relationship variables, the outcomes of the most recent credit application, the ratio of cash to assets, and the firm and owner delinquency variables. I rerun my analysis on a model specification that excludes these variables to investigate whether my findings for the remaining variables are robust. The results of these tests are available from the author upon request, but, for brevity, are not shown here.

Table VI. Determinants of Capital Structure at Positive Equity Privately Held Firms

This table presents the results from a weighted-least-squares regression model where the dependent variable is firm leverage as measured by the ratio of total loans to total assets. Data are taken from the 1987, 1993, 1998, and 2003 Surveys of Small Business Finances. Firms with negative equity are excluded from the analysis. For each explanatory variable, the table presents its regression coefficient ("Coef.") and associated *t*-statistic ("t-Stat"). Explanatory variables are defined in Table I.

<i>Panel A. Leverage as Measured by the Ratio of Total Loan to Total Assets</i>								
Variable	1987 Coef.	1993 t-Stat	1998 Coef.	2003 t-Stat	Coef.	t-Stat	Coef.	t-Stat
Intercept	-0.057	-1.21	0.178***	4.08	-0.042	-0.98	0.011	0.28
<i>Firm characteristics</i>								
Industry target leverage	0.254***	5.01	0.431***	10.14	0.222***	5.94	0.168***	5.36
Corporation	0.015	1.12	0.015	1.23	0.058***	5.10	0.058***	6.06
Partnership	0.041*	1.90	0.011	0.55	0.066***	3.24	0.074***	4.44
Log of firm age	-0.053***	-9.63	-0.020***	-2.82	-0.025***	-4.09	-0.041***	-7.47
Log of assets	0.016***	4.44	-0.005*	-1.78	0.006**	2.03	0.004	1.60
Sales growth positive	-0.015*	-1.67	0.005	0.53	-0.004	-0.43	0.013	1.55
Profits positive	-0.016	-1.54	-0.011	-1.19	0.003	0.23	-0.016*	-1.73
Cash to assets	-0.171***	-6.77	-0.137***	-7.49	-0.058***	-3.41	-0.026	-1.55
Tangible assets to assets	0.118***	7.17	0.101***	6.73	0.092***	6.92	0.145***	11.34
Firm has been delinquent	n/a	n/a	-0.011	-0.86	0.028*	1.70	-0.006	-0.43
<i>Financing characteristics</i>								
One commercial bank	0.096***	4.73	0.080***	5.63	0.074***	5.27	0.049***	3.87
One nonbank	0.090***	8.64	0.047***	4.88	0.045***	4.52	0.044***	4.62
Multiple commercial banks	0.154***	7.13	0.134***	8.40	0.143***	8.62	0.108***	7.46
Multiple nonbanks	0.132***	9.75	0.095***	8.36	0.109***	9.01	0.065***	6.08
Firm uses credit cards	n/a	n/a	0.013	1.51	-0.005	-0.57	-0.014	-1.42
Firm rolls CC balance	n/a	n/a	0.042***	3.21	0.027**	2.02	0.048***	4.48
Firm uses trade credit	0.007	0.56	-0.080***	-8.04	-0.017*	-1.73	-0.031***	-3.30
Firm paid late on trade credit	0.028***	2.82	0.012	1.13	0.007	0.58	0.035***	3.08
Firm was discouraged	n/a	n/a	0.040***	3.14	0.060***	4.56	0.006	0.41
Firm was approved	n/a	n/a	0.079***	7.88	0.085***	7.08	0.109***	11.03
Firm was denied	n/a	n/a	0.039**	2.15	-0.034	-1.48	0.120***	5.49
<i>Owner characteristics</i>								
Founder	0.006	0.61	-0.011	-1.18	-0.008	-0.77	-0.038***	-3.87
Owns 100% of firm	-0.001	-0.09	-0.002	-0.19	-0.005	-0.42	0.001	0.06
Owner age	n/a	n/a	-0.001**	-2.13	0.000	-0.09	0.000	-0.36
Owner experience	n/a	n/a	0.000	-0.55	0.000	0.09	0.002***	3.08
Owner is college grad	n/a	n/a	-0.006	-0.72	0.018**	2.17	0.018**	2.27
Owner is female	-0.030**	-2.29	-0.020**	-2.00	-0.009	-0.95	-0.007	-0.76
Owner is Black	-0.009	-0.31	-0.053**	-2.23	-0.046**	-2.18	-0.004	-0.18
Owner is Asian	-0.074***	-2.71	0.006	0.31	-0.005	-0.24	-0.020	-1.04
Owner is Hispanic	-0.013	-0.39	-0.035*	-1.79	-0.003	-0.20	-0.051***	-2.62
Owner has been delinquent	n/a	n/a	-0.027*	-1.95	0.009	0.56	-0.004	-0.25
Adjusted R ²	0.204		0.166		0.241		0.270	
Observations	2,952		3,909		2,725		3,314	

(Continued)

Table VI. Determinants of Capital Structure at Positive Equity Privately Held Firms (Continued)

<i>Panel B. Leverage as Measured by the Ratio of Total Liabilities to Total Assets</i>								
Variable	1987 Coef.	1993 t-Stat	1998 Coef.	2003 t-Stat	Coef.	t-Stat	Coef.	t-Stat
Intercept	-0.006	-0.11	0.374***	7.30	-0.047	-0.88	0.035	0.76
<i>Firm characteristics</i>								
Industry target leverage	0.276***	5.83	0.440***	8.50	0.192***	5.56	0.159***	4.98
Corporation	0.042***	2.89	0.050***	3.95	0.110***	8.03	0.125***	11.27
Partnership	0.023	1.00	0.023	1.13	0.088***	3.58	0.073***	3.77
Log of firm age	-0.060***	-10.17	-0.021***	-2.75	-0.017**	-2.38	-0.046***	-7.19
Log of assets	0.020***	5.19	-0.018***	-6.51	0.012***	3.64	0.004	1.45
Sales growth positive	0.004	0.42	0.006	0.68	0.004	0.38	0.015	1.64
Profits positive	-0.034***	-2.98	-0.005	-0.55	0.019	1.47	-0.013	-1.22
Cash to assets	-0.247***	-9.04	-0.122***	-6.36	-0.109***	-5.25	-0.072***	-3.75
Tangible assets to assets	-0.025	-1.41	0.022	1.43	-0.004	-0.24	0.072***	4.87
Firm has been delinquent			0.022*	1.67	0.074***	3.79	-0.008	-0.54
<i>Financing characteristics</i>								
One commercial bank	0.098***	4.46	0.065***	4.38	0.086***	5.10	0.071***	4.80
One nonbank	0.087***	7.77	0.020**	2.04	0.055***	4.56	0.051***	4.68
Multiple commercial banks	0.173***	7.38	0.105***	6.28	0.153***	7.64	0.130***	7.73
Multiple nonbanks	0.146***	9.99	0.081***	6.76	0.113***	7.72	0.082***	6.69
Firm uses credit cards			0.009	0.96	-0.009	-0.74	-0.004	-0.39
Firm rolls CC balance			0.016	1.20	0.050***	3.16	0.069***	5.55
Firm uses trade credit	0.059***	4.10	-0.032***	-3.05	0.013	1.06	-0.009	-0.79
Firm paid late on trade credit	0.068***	6.30	0.036***	3.20	0.040***	2.88	0.084***	6.40
Firm was discouraged			0.051***	3.80	0.071***	4.40	0.020	1.14
Firm was approved			0.076***	7.22	0.110***	7.58	0.120***	10.53
Firm was denied			0.062***	3.25	0.009	0.34	0.117***	4.63
<i>Owner characteristics</i>								
Founder	0.013	1.12	-0.020**	-2.01	-0.024*	-1.92	-0.038***	-3.31
Owens 100% of firm	-0.022	-1.53	-0.001	-0.06	-0.007	-0.47	0.011	1.04
Owner age			-0.001	-1.29	-0.001*	-1.71	0.000	-0.62
Owner experience			0.000	0.55	0.000	0.25	0.001**	2.37
Owner is college grad			-0.002	-0.20	0.018*	1.73	0.018*	1.94
Owner is female	-0.039***	-2.76	-0.020*	-1.93	-0.014	-1.16	-0.011	-1.05
Owner is Black	-0.018	-0.56	-0.039	-1.58	-0.060**	-2.31	-0.015	-0.60
Owner is Asian	-0.020	-0.68	-0.005	-0.22	-0.020	-0.86	-0.029	-1.31
Owner is Hispanic	0.044	1.24	-0.015	-0.73	-0.019	-0.89	-0.071***	-3.16
Owner has been delinquent			-0.019	-1.32	0.003	0.18	-0.022	-1.32
Adjusted R^2	0.267		0.110		0.295		0.299	
Observations	2,952		3,909		2,725		3,314	

***Significant at the 0.01 level.

**Significant at the 0.05 level.

*Significant at the 0.10 level.

I find that five variables remain consistently reliable predictors of leverage as measured by the loan-to-asset ratio: 1) industry target leverage, 2) my indicator for corporations, 3) (log of) firm age, 4) my profitability indicator, and 5) the tangibility of assets. I find similar results for leverage as measured by the liabilities-to-assets ratio, except that the tangibility of assets becomes unreliable.

I also use this specification to look only at positive equity firms. For the loan-to-asset ratio, I find four reliable predictors of capital structure: 1) industry target leverage, 2) (log of) firm age, 3) firm size as measured by log of assets, and 4) the tangibility of assets. My indicator for corporations remains positive in all four surveys, but loses statistical significance in the 1987 survey.

For the liability-to-asset ratio, I also find four reliable predictors of capital structure: 1) industry target leverage, 2) my indicator for corporations, 3) (log of) firm age, and 4) the tangibility of assets. Firm size is positive and significant in three of the four surveys, but negative and insignificant in the 1993 survey.

3. Firm Size

As noted in footnote 8, there are three alternative measures of firm size that have been used extensively in the literature: 1) assets, 2) employment, and 3) sales. I have focused on assets as my measure of firm size. When I replace assets by sales or employment, the negative relation between size and leverage disappears, consistent with my findings when I omit negative-equity firms. However, I find no consistent relation between leverage and firm size as measured by either sales or employment.

IV. Summary and Conclusions

The capital-structure decision is one of the most fundamental issues in corporate finance, yet academics have largely neglected the study of leverage at privately held firms, which are critically important to the economy. In this study, I utilize data from a series of four nationally representative surveys of privately held US firms conducted from 1987 to 2003 to provide new evidence regarding what factors have reliably consistent relations with book-value leverage.

I find that that privately held firms, in general, employ a comparable degree of leverage relative to small publicly traded firms when leverage is measured by the ratio of loans to assets, but employ less leverage when leverage is measured by the ratio of total liabilities to total assets. This finding is quite different from Brav (2009), who reports that in the United Kingdom, private firms use much more leverage than do public firms.

I also find that leverage ratios by industry of privately held and public firms are highly correlated in most years when leverage is measured by loans to assets, but less so when leverage is measured by liabilities to assets. Hence, these differences appear to be driven by the use of trade credit. Small firms are thought to be more reliant upon trade credit than are large firms.

In addition, my results indicate that firm leverage, as measured by either the ratio of total loans to total assets or by the ratio of total liabilities to total assets, is consistently related to five factors: 1) median industry leverage, 2) corporate legal form of organization, 3) firm age, 4) the number of bank and nonbank relationships, and 5) minority ownership. Several other factors are generally related to leverage, but are not consistently significant in explaining leverage in each of the four surveys I analyze. My finding that leverage has a consistently negative relation with firm age is inconsistent with the results for the Compustat firms reported by Frank and Goyal (2009), but is

consistent with the results from the 1987 SSBF reported by Petersen and Rajan (1994), who write that “a natural explanation for this is that young firms are externally financed while old firms finance via retained earnings.” In contrast, older public firms appear to finance via increased borrowing.

My findings contribute to the capital-structure literature in at least five important ways. First, I provide, for the first time, a set of stylized facts about the capital structure at privately held US firms; factors that consistently predict firm leverage. Previous research has focused almost entirely upon publicly traded corporations, whose credit needs are fundamentally different from those of private firms and where the capital-structure decision is complicated by the wide variety of debt and equity instruments used by large firms.

Second, I provide new evidence regarding how the use of financial institutions influences capital structure. The literature has long established how important firm-lender relationships are to small private companies. Here, I extend this literature by documenting a positive relation between the number of relationships that a firm has with financial institutions and the firm’s leverage.

Third, I provide new evidence as to how the characteristics of the firm’s primary owner influence capital structure. I find that minority-owned firms generally use less leverage than white-owned firms.

Fourth, I provide new evidence on how the use of credit cards and trade credit influence capital structure. I find that firms using credit cards to roll over balances from month-to-month are generally more highly levered, suggesting that such credit-card debt is a complement rather than a substitute for bank debt. I find that firms using trade credit are no more highly levered than firms that do not use trade credit, implying that trade credit is a substitute rather than a complement for bank credit.

Finally, I provide new evidence concerning which of the competing theories of capital structure best predict the capital structure of private companies. As Myers (2001) points out, capital-structure theories “are not designed to be general” so that “testing them on a broad, heterogeneous sample of firms can be uninformative.” In general, my results are mixed, providing some support for both the Pecking-Order and Trade-Off theories.

Much work remains to be done to better understand the capital structure of privately held firms, but to test dynamic models of firm capital structure, one needs panel data on small firms. Newly available panel data sets, such as the Kauffman Firm Survey and SageWorks, offer researchers opportunities to build upon the foundation of stylized facts that I have established in this study.

Appendix

Table A1. Additional Descriptive Statistics for Variables Used to Explain Capital Structure at Privately Held Firms

For each continuous variable in each survey year, this table presents the standard error, minimum value, and maximum value. Corresponding means and medians appear in Table III. The number of observations for the 1987, 1993, 1998, and 2003 SSBFs are 3,208, 4,601, 3,479, and 4,074, respectively.

Variable	1987			1993			1998			2003		
	Std. Err.	Min.	Max.	Std. Err.	Min.	Max.	Std. Err.	Min.	Max.	Std. Err.	Min.	Max.
<i>Firm characteristics</i>												
Loans to assets	0.216	0	1.89	0.178	0	1.21	0.011	0	2.27	0.346	0	2.01
Liabilities to assets	0.265	0	2.58	0.205	0	1.59	0.019	0	4.26	0.468	0	2.83
Firm age	6.635	0	118	5.887	0	216	0.188	0	104	6.673	1	103
Total assets (\$000)	1,320	0	154,087	1,140	0	110,000	34	0	99,912	1,681	0	196,050
Sales (\$000)	3,451	0	202,000	2,080	0	335,660	109	0	624,000	2,724	0	210,861
Total employment	15,304	0.5	475	10,810	0.5	495	0.398	1	482	12,496	0	486
Return on assets	0.458	-0.325	2.39	0.639	-1.05	4.24	0.036	-0.633	7.753	1.118	-0.518	6.25
Cash to assets	0.116	-0.044	1	0.115	-0.026	1	0.005	0	0.993	0.185	-0.08	1
Tangible assets to assets	0.177	0	0.99	0.136	0	1	0.006	0	1	0.217	0	1
<i>Owner characteristics</i>												
Ownership share	n/a	n/a	n/a	12.621	0	100	0.416	1	100	0.296	0	1
Owner age	n/a	n/a	n/a	5.556	19	92	0.189	19	95	15.053	8	100
Owner experience	n/a	n/a	n/a	5.366	0	70	0.193	0	72	6.901	19	92
<i>Financing characteristics</i>												
Number of financial institutions	0.727	0	12	0.695	0	19	0.024	0	20	0.923	0	20
Number of commercial banks	0.429	0	12	0.388	0	13	0.013	0	13	0.489	0	20
Number of nonbanks	0.560	0	11	0.545	0	13	0.019	0	15	0.750	0	11

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