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The Role of Owner in Capital Structure Decisions: An Analysis of Single-Owner Corporations

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Abstract

This study examines the extent to which individual demographic characteristics of owners influence capital structure decisions. Using the Federal Reserve's 2003 Survey of Small Business Finances, we estimate the joint effects of traditional capital structure determinants and manager age, gender, education, business experience, sophistication, and wealth on the capital structure of single-owner corporations. By calculating the marginal contribution of personal risk tolerance, we demonstrate that owner preference contributes meaningfully to the explained variation in capital structure decisions.

The Role of Owner in Capital Structure Decisions: An Analysis of Single-Owner Corporations

Traditional capital structure theory is an important part of finance with most of the fundamental theories originating over twenty-five years ago.[1] While there have been a large number of articles on traditional capital structure theory since this time, few fundamental changes have been proposed. An assumption that has remained persistent over time is that owner characteristics do not matter in the capital structure decisions of firms, since the theory implicitly assumes these owners have well diversified personal portfolios (Modigliani and Miller (1958)). We argue that this is not the case for many owners of firms and demonstrate that individual demographic characteristics of owners can help better explain capital structure decisions.

Unlike the standard assumptions in portfolio theory, many owners of businesses do not hold a diversified portfolio. This is particularly true for small firms wherein the owner of the firm tends to serve as manager, resulting in little or no separation of ownership from control. Take for instance, single-owner C and S corporations. While C and S corporations enjoy the benefits of limited liability, the owners of these firms commonly pledge personal as well as business assets as collateral in order to secure requisite financing, and thus the personal assets and business assets tend to be commingled—just as is the case for proprietorships and partnerships. This results in a further reduction in the personal diversification by these owners. Since business failure can lead to financial loss or ruin at the personal level, individual owner preferences should affect the capital structure of their business. Similarly, families that have a great deal of wealth tied up in their businesses would not be considered to have a diversified portfolio. It is estimated that 80% of businesses in the United States and 95% of businesses world-wide are owned by families (Gersick, Davis, Hampton, and Lansberg (1997) and Litz (1995), respectively). These businesses include sole proprietorships, LLCs, partnerships, and C and S corporations. The preferences and risk tolerance of these owners will play a role in their choice of capital structure. There are also many CEOs and other senior managers that have a great deal of financial wealth tied up in company stock or stock options as well as their largely undiversified human capital. Although many companies may have shareholders that are diversified, the decision makers (top management, controlling families) are not. The choices these individuals make regarding the firm's capital structure can have a profound impact on their own personal finances. Personal preferences and the risk tolerance of these individuals play a role in the business decision making.

Utilizing data from the Federal Reserve's 2003 Survey of Small Business Finances (SSBF), we examine the leverage ratios of C and S corporations owned entirely by one individual, taking into account both traditional capital structure determinants and personal risk tolerance. Traditional capital structure considerations include agency theory, asymmetric

[1] Some major traditional capital structure theory pieces come from Modigliani and Miller (1958 and 1963), Jensen and Meckling (1976) (agency theory), Akerlof (1970) (asymmetric information), Spence (1973) and Ross (1977) (signaling), Miller (1977) (taxes), Warner (1977) (bankruptcy costs), and Myers and Majluf (1984) and Myers (1984) (pecking-order theory).

information, and bankruptcy/distress costs. Extant literature in corporate finance suggests that these issues are relevant not only to large public corporations but also to privately held businesses (Mills and Schumann (1985), Ang (1991 and 1992), Hutchinson (1996), Berger and Udell (1998), Chittenden, Hall, and Hutchinson (1995), Ang, Cole, and Lin (2000), Romano, Tanewski, and Smyrnios (2000)).

Extant literature on individual risk-taking behavior shows that demographic and socioeconomic factors influence individual risk tolerance, e.g., gender, age, wealth, income, education, personal business experience, and sophistication of the individual. That is, an individual's ability and willingness to bear risk could be shaped by his or her personal characteristics. It is generally believed that males are more risk tolerant than females and that risk taking tends to decrease with age and increase with education level, higher levels of income, wealth, professional experience, and sophistication.[2]

While many of these relationships were discovered in the psychology literature some time ago, there has been a growing body of literature in finance focusing on the relationship between individual manager characteristics and firm performance. Most relevant to our paper include studies that consider the effects of manager characteristics on corporate behavior and performance, such as Graham and Harvey (2001), Bertrand and Schoar (2003) and Ben-David, Graham, and Harvey (2007).

Graham and Harvey (2001) examine capital budgeting, cost of capital, and capital structure of firms via cross-sectional survey data on 392 chief financial officers (CFOs), 64% of which are publicly traded. By assuming that the CFOs act as agents for the Chief Executive Officers (CEOs), Graham and Harvey (2001) examine the relation between the executive's responses and firm characteristics, including information on CEOs such as management ownership, CEO age, and the education of the CEO (MBA to other). Among their findings, they show that CEOs holding MBA degrees tend to use more sophisticated valuation techniques, while older CEOs favor the payback period as a capital budgeting technique. Graham and Harvey (2001) find little evidence that executives are concerned about asymmetric information, transaction costs, free cash flows, or personal taxes, but do find some support for the pecking-order and trade-off capital structure theories.

[2] For risk taking and gender, see Barsky et al. (1997), Jianakoplos and Bernasek (1998), Donkers, Melenberg, and van Soest (2001), Hartog, Ferrer-i-Carbonell, and Jonker (2002), Hallahan, Faff, and McKenzie (2004), and Eckel and Grossman (2008); as summarized by Borghans, Duckworth, Heckman, and Weel (2008), risk taking tends to increase sharply in adolescence (Steinberg (2004), (2007)) and then throughout adulthood tends to decrease with age (Dohmen et al. (2005)). This relationship would be represented by an inverted U-shaped curve. For risk taking and age, see Wallach and Kogan (1961), McInish (1982), Morin and Suarez (1983), Palsson (1996), Hallahan, Faff, and McKenzie (2004), Dohmen et al. (2005); for risk taking and education, see Weiss (1972), Binswanger (1980, 1981), Grable and Lytton (1999), Xiao, Alhabeeb, Hong, and Haynes (2001), Guiso and Paiella (2001), Hallahan, Faff, and McKenzie (2004), Ferrer-i-Carbonell (2005), Anderson et al. (2005), and Belzil and Leonardi (2006); for risk taking and income/wealth, see Friedman (1974), Cohn, Lewellen, Lease, and Schlarbaum (1975), Blume (1978), Shaw (1996), Grable and Lytton (1999), Xiao, Alhabeeb, Hong, and Haynes (2001), Hallahan, Faff, and McKenzie (2004); for risk taking and professional experience/sophistication, see Grey and Gordon (1978), Masters (1989), Haliassos and Bertaut (1995), Grable and Lytton (1999), and Xiao, Alhabeeb, Hong, and Haynes (2001).

Bertrand and Schoar (2003) investigate whether individual managers matter by tracking top managers across different firms over time. Manager fixed effects are found to explain a significant amount of the heterogeneity in investment, financial, and organizational practices of firms. In terms of observable managerial characteristics, Bertrand and Schoar (2003) test the effects of age and education on firm behavior and find that older groups of managers tend to be financially more conservative, while managers with an MBA degree follow more aggressive strategies. In a related paper, Chevalier and Ellison (1999) find that younger mutual fund managers who attended higher quality schools (higher SAT scores) are more risk tolerant in their investment decisions and earn higher rates of returns.

A number of recent studies have focused on the overall optimism, or overconfidence, of top executives. Goel and Thakor (2005) develop a model where agents of *a priori* unknown ability are being judged relative to each other to determine who wins the race for CEO.[3] They show that overconfident agents who underestimate project risk have a higher probability of being chosen CEO than otherwise identical managers. The rationale stems from the fact that promotion of managers in firms tends to be tied to past performance, which is correlated to the risk taken by these agents. As Ben-David, Graham, and Harvey (2007) summarize the argument, "the variance of the outcomes from their actions is greater, and therefore overconfident managers will be over-represented among the right-tail "winners" and are more likely to get promoted."

Ben-David, Graham, and Harvey (2007) empirically test whether CFO optimism affects corporate policies via twenty-five quarterly surveys between March 2001 and March 2007 on senior executives, mostly CFOs. Using a survey-based proxy for overconfidence, they show that companies with overconfident CFOs tend to invest more and have higher debt leverage, and that merger announcements by these firms are negatively received by investors. Demographic characteristics are collected for only two of the twenty-five surveys (roughly 400 CFOs), and few significant relations are found between overconfidence and demographic attributes (not tabulated). Barros and da Silveira (2007) and Hackbarth (2008) also test the effects of CEO overconfidence on corporate behavior, and similarly find that firms with overconfident managers are associated with higher leverage ratios.[4]

While it has been becoming increasingly clear that individual managers have an effect on firm behavior and performance, the scope and magnitude of these effects is undetermined. Our study is the first to use a comprehensive set of demographic and socioeconomic characteristics of firm managers to explore their effects on managerial decision-making. These characteristics include manager age, gender, education, business experience, sophistication, and wealth. This extension is possible via the use of the 2003 SSBF, which provides detailed information on both

[3] In a prior study, Lazear (2004) argues that while workers are promoted due to meeting or exceeding some standard, the promotion is not based solely on lasting ability, but also on transitory components that may reflect short-term luck. This results in a regression of the mean, creating a "Peter principle" (Peter and Hull (1969)). Lazear (2004) shows that although firms inflate the promotion criterion to offset the regression bias, the effect is never eliminated. Faria (2000) and Fairburn and Malcolmson (2001) explain the "Peter principle" as a byproduct of using promotion to solve a moral hazard problem, where firms choose promotion because workers must live with the consequences of their decision.

[4] See Malmendier and Tate (2005a, 2005b) for a review of the relevant psychology and experimental evidence on overconfidence, as well as alternative proxies for overconfidence.

the personal and business characteristics of 536 single-owner C and S corporations. By calculating the marginal contribution of personal risk tolerance, we demonstrate that the preference of the owner accounts for 33% to 60% of the explained variation in the capital structure decisions of these owners. Our results also show that firm leverage is positively related to owner age, business experience, sophistication, number of financial institutions used by the owner, sales of the firm, and whether or not the owner uses computers for business purpose or pledges collateral.

This is the first study to quantify the extent of individual manager effects and to also suggest solidifying personal risk characteristics as a fundamental component in traditional capital structure theory. Our study serves as a baseline, using data from single-owner, privately-held C and S corporations. From an empirical standpoint, this baseline provides the cleanest way to estimate individual preferences due to the fact that the personal and business assets of these owners tend to be commingled. A natural extension to this study would be to look at multiple-owner privately-held firms, and, eventually, at publicly traded firms; however, confounding problems such as the separation of ownership and control, conflicting preferences from multiple owners, and the design of higher power compensation packages to low ownership managers may cause challenges in identifying specific determinants in the capital structure of these firms.

The rest of the paper is developed as follows. We describe the data in Section II. Methodology is presented in Section III and results in Section IV. In Section V, we conclude.

II. Data

We use data from the Federal Reserve's 2003 Survey of Small Business Finances (SSBF). Conducted during 2004-2005 for the Board of Governors of the Federal Reserve System and released in September of 2006, the SSBF gathered information on a nationally-representative stratified-random sample of for-profit, nonfinancial, nonfarm, nonsubsidiary business enterprises that had fewer than 500 employees and were in operation as of year-end 2003 and on the date of the interview. The 2003 SSBF has detailed information on firm and owner characteristics for 4,240 firms, including 1,284 sole proprietors, 215 partnerships, 200 LLCs, 47 LLPs, and 2,494 C and S Corporations. The sample is representative of approximately 6.3 million firms that met the target population definition and were listed on the Dun's Market Identifier file as of May 2004. As with most surveys, there is a certain amount of missing data for nearly all SSBF questions. Approximately 1.8% of all values collected were missing. FRB staff imputed most of these missing values via a randomized regression model but provide multiple implicates to enable researchers to account for the additional variance introduced by imputation.[5] The public-use data set contains five implicates of the 4,240 firms, for a total of 21,200 firm-implicate observations, which enables researchers to quantify the effects that imputed values have on estimates of standard errors. All regressions reported in our study make

[5] For detailed information on how the imputations were conducted and how to properly use them, see pages 14-16 and 40-51 of the Technical Codebook of the 2003 Survey of Small Business Finances.

use of the multiple implicates and sampling weights, which enables us to obtain unbiased coefficient estimates of the target population's statistics.[6]

We begin by excluding sole proprietors, partnerships, LLCs, and LLPs from the sample, leaving a sample of 2,494 firms (946 C and 1,548 S corporations).[7] This is in attempt to create a sample of small businesses that is most representative of firm samples typically used in traditional capital structure studies, which tend to be corporations that offer limited liability and easy transferability. By including C and S corporations with limited liability protection, we are able to identify those owners who are willing to give up the protection by pledging personal assets as collateral. This allows us to separate those who are overoptimistic/overconfident, and to study the effect of giving up limited liability protection on debt increases. We further reduce the sample to include only those firms that are 100% owned by a single individual, resulting in 940 firms (289 C and 651 S corporations). From an empirical standpoint, single-owner firms provide the cleanest way to estimate individual preferences. We also drop firms that fail to report total assets and firms that report non-positive total assets, leaving 928 firms (268 C and 642 S Corporations). Since our sample focus is on small businesses and most banks use $10 million as the cut-off for small business, we exclude firms with greater than $10 million in sales, leaving a sample of 842 firms (259 C and 583 S corporations).[8] To avoid skewness in results, we also exclude firms with greater than $10 million in total assets, leaving 835 firms (256 C and 579 S corporations). We also attempt to identify and eliminate constrained firms, where they are no longer able to choose their desired capital structure. Firms that were either discouraged from applying for loans in fear of rejection or were denied a loan or renewal of line of credit over the past three years were dropped from the sample, leaving 675 firms (211 C and 464 S Corporations). Also, firms with negative equity were eliminated from the sample, resulting in a final sample of 536 firms (160 C and 376 S Corporations).

We use the leverage ratio, defined as total liabilities divided by total assets, to study the capital structure of these firms. Definitions of all variables used in the study are displayed in Appendix A. Firms with higher leverage ratios are to be associated with single owner firms who are willing to take greater financial risks. In contrast, the same could not be said if we were dealing with multiple-owner firms, as firm risk may result from the culmination of conflicting preferences of multiple owners. While no winsorizing is necessary for the leverage ratio distribution, some of our explanatory variables have a few extreme outliers. We choose to winsorize these problematic variables at the 99% level.

For traditional capital structure determinants, we choose the best possible proxies from available data for agency costs, asymmetric information, and bankruptcy/distress costs. These include whether or not the single owner is also the manager of the firm vs. those that hired

[6] It appears that few studies to date have properly used the implicates and weighting statistics to account for the stratification. According to the Technical Handbook of the 2003 SSBF, unweighted sample means and frequencies will give unbiased estimates of the sample, but biased estimates of the population. This is especially true for variables that are closely related to firm size.
[7] There are only 11 LLCs that are 100% owned by a single individual that filed taxes as a corporation, and are therefore dropped from the sample.
[8] We run our analyses with and without firms with sales exceeding $10 million and find no significant differences in results (not tabulated).

another person as manager (agency cost variable); the age of the firm and the number of financial institutions used by the firm (asymmetric information); and whether or not the owner has declared bankruptcy in the last 7 years, a categorical representation of the Dun & Bradstreet Credit Score, the traditional one-digit industry classification, return on assets, firm sales, and number of employees (bankruptcy/financial-distress costs).[9]

Socioeconomic and demographic variables of the firm owner are separated into one of two groups, measures of willingness to bear risk or ways to reduce risk. Measures of willingness to bear risk include age, gender, and wealth of owner, as well as owner loans to the firm. We use age of the owner as a measure of risk bearing, as the age of an individual has been shown to be a reasonable predictor of risk-taking activity; with younger people engaging in higher risk activities. The sex of the owner is used as a measure of risk since males are generally believed to be more risk tolerant; however, our sample is primarily composed of entrepreneurs, so our results may suffer from a self-selection bias since entrepreneurs tend to be more risk tolerant than non-entrepreneurs. That is, we may find that female entrepreneurs are as risk tolerant as male entrepreneurs. Wealth of the owner is comprised of owner equity in firm, owner equity in primary residence, and other net worth of owner. The rationale for using wealth of the owner as a measure of risk is similar in theory to using the age of the owner in that wealthier (younger) managers have additional means (time) from which to recover from losses incurred from riskier activities. Owner loan to firm represents the extent to which owners are willing to comingle personal assets with business assets, and thus is used as a measure of owner's willingness to bear risk.

Although risk-taking is a necessity in any business venture, we consider determinants that may reduce risk of firms from action taken, specifically the sophistication, education, and experience of the owner. As proxies for sophistication, we consider whether or not the owner uses computers for business purposes and the number of business tasks for which the owner uses computers. Computer usages may include online banking, e-mail, purchasing business products or services, applying for loans or other forms of credit, managing inventory, administrative functions such as word processing, managing the firm's accounts/bookkeeping, other business tasks, or to directly contribute to the firm's primary business activity. The greater the computer usage, the more savvy the owner is assumed to be. Owners with college degrees and/or graduate degrees are assumed to have the additional knowledge necessary for better decision-making and thus may be more capable than owners without college or graduate degrees to understand risky choices. The same is implied for owners with more business experience. A more experienced owner should have the ability to better analyze the risk and reward of opportunities that confront them. We use dummy variables for whether or not the owner has a college degree or a graduate degree (note these are two separate variables, not a single indicator). Business experience is simply the number of years of experience the owner has managing or owning a business. We also consider measures of the owner's willingness to personally bear the risks in the business, or to put personal wealth at risk in the business. These are: whether or not the owner pledges

[9] Note that some variables can fall into multiple categories, e.g., whether or not the firm or individual declared bankruptcy in the last 7 years, sales, and number of employees could also be associated with asymmetric information.

collateral, guarantees a loan, or pledges personal assets to all or some firm loans and the ratio of owner net worth to firm assets. The last item is inversely related to the extent owners' wealth is tied up in the business; it is also a measure of personal wealth diversification.

We also collect information on the trade credit of these firms as a means to assess their relative financial health. We identify firms that have paid late on trade credit as potentially distressed and firms that have high percentages of late payments as distressed or severely distressed. We discuss the use of these characterizations below.

III. Methodology

To provide new evidence that owner preference contributes meaningfully to the explained variation in capital-structure decisions, we first compare the mean leverage ratios of the firm owners according to the various firm and owner characteristics discussed above. Secondly, we estimate the joint effects that traditional capital-structure determinants and socioeconomic and demographic characteristics have on firm leverage ratios. As with all of our regression estimates, we use SAS survey procedures to obtain unbiased coefficient estimates.[10]

The first regression to estimate is:

$$\text{levratio}_i = \gamma_1 + \gamma_2 \text{TCS}_i + \varepsilon_i \quad (1)$$

where: $levratio_i$ is leverage ratio [(total liabilities)/(total assets)] for firm i; several alternative measures of leverage are used in the estimations. TCS_i is a set of independent variables containing traditional variables used to explain capital structure for firm i that are constructed from the SSBF database. These are: a dummy variable equal to one if the owner is the manager of the firm, age of the firm in years, the number of financial institutions used by the firm, a dummy variable equal to one if the owner has declared bankruptcy in the last 7 years, a categorical representation of the Dun & Bradstreet credit score ranging from 1 (most risky) to 6 (least risky), dummy variables for the traditional one-digit industry classification, return on assets of firm, the log of firm sales, and number of firm employees.
ε_i is the error term for firm i. γ's are coefficients to be estimated.

Next, we estimate the joint effects that the socio-economic and demographic determinants of the owner have on each of the firm leverage ratios. We first use the same survey techniques to estimate the following regression:

$$\text{levratio}_i = \gamma_1 + \gamma_2 \text{PRT}_i + \varepsilon_i \quad (2)$$

[10] First, we utilize PROC SURVEYREG to estimate our parameters separately for each implicate, appropriately adjusting for sample weights and sample design. Next, we use PROC MIANALYZE to estimate the between-imputation variance of each parameter and then combine the between-imputation variance with sampling variance to obtain an overall (sample and imputation) variance. Coefficient estimates and their statistical significance are then analyzed.

where levratio$_i$, ε_i, and γ's are defined as above. PRT_i is a set of personal risk tolerance or ability to deal with risks variables, including age of the owner in years, a dummy variable equal to one if the owner is female, the dollar amount owner loans to firm, the dollar amount of owner equity in primary residence, the dollar amount of owner equity in firm, the dollar amount of other net worth of owner, a dummy variable equal to one if the owner uses computers for business purposes, the number of business tasks for which the owner uses computers, a dummy variable equal to one if the owner has a college degree, a dummy variable equal to one if the owner has a graduate degree, owner business experience in years, a dummy variable equal to one if the owner has pledged collateral, a dummy variable equal to one if the owner guarantees a loan, and a dummy variable equal to one if the owner pledges personal assets.

Finally, we regress firm leverage ratios on the full model. The full model is:

$$\text{levratio}_i = \gamma_1 + \gamma_2 \text{TCS}_i + \gamma_3 \text{PRT}_i + \varepsilon_i \quad (3)$$

where $levratio_i$, TCS_i, PRT_i, ε_i, and γs are defined as above. We then take the difference between the explained variations in the expanded traditional with owner's risk taking variables model (3) to that of the traditional variables only regression model (1) to determine the marginal contribution (statistical) of the personal risk-tolerance variables in explaining the observed capital structure of these firms.

Our purpose is to report empirically the extent personal risk characteristics contribute to the explained variation in capital-structure decisions. We predict that female owners and older owners will have a negative and significant effect on the observed leverage ratios, while education, wealth, business experience, sophistication, and owner's willingness to pledge collateral or loan money to the firm will have a positive and significant effect on the observed leverage ratios.

In the next set of regressions, we consider a possible endogeneity problem as the owners may reach the decisions on several variables the same time they decide on firm leverage. These variables are whether or not the owner pledges collateral, guarantees a loan, or pledges personal assets. We estimate these variables separately as a function of all exogenous variables in the variables sets, TCS and PRT, as in two stage least squares.

$$y_i = \gamma_1 + \gamma_2 \text{TCS}_i + \gamma_3 \text{PRT}_i + \varepsilon \quad (4)$$

where TCS_i, PRT_i, ε_i, and γs are defined as above. y_i is either a collateral, guarantee, or personal assets dummy variable equal to one if firm owner *i* pledges collateral, guarantees a loan, or pledges personal assets, respectively.

First, we use the survey techniques as in the previous regressions, regressing y_i on TCS_i, then on PRT_i, and finally on both TCS_i and PRT_i. This allows us to measure the incremental contributions of owner's personal characteristics on their willingness to commit more personal wealth to the business. To consider the possible endogeneous relationship we include eq. (4)

along with eq. (3) in a simultaneous system, adding collateral, guarantee, and personal assets as an independent variable and use two-stage least squares to estimate the system.

To further analyze the role of collateral, we divide the firms into two subsamples based on whether or not the owner has pledged personal assets, guaranteed, or cosigned to obtain recent business related loans, line of credits, or leases. We interpret the pledging of personal assets, etc., as evidence that the owner commingles personal assets with business assets, whereas non-pledging reflects an owner isolating personal assets from business assets.[11] This demarcation is of practical significance, as it reflects whether unlimited liability of the corporate business form is retained or not by their owners.

Up to this point, we have assumed that the leverage ratios for our sample of firms reflect the levels of risk aversion of the owners. However, there is a problem common to all empirical estimations of capital structure based on theory – the theory predicts a capital structure assuming the managers or owners have the freedom to choose. Over time, however, many firms can lose this ability to choose, such as when the business or owner falls on hard times. In some cases, the firms may be distressed to the point where more debt, due to addition or even delay or late payment, may be essential to continue operations. Thus, the observed leverage ratio may not truly reflect the risk aversion of the owner, but instead reflect a forced outcome. To control for these types of situations, we attempt to identify and eliminate these financially constrained firms from the sample.

We begin by collecting information on the trade credit of these firms, which is short-term financing extended by suppliers to firms allowing for payment of goods and services to be made some time after the delivery date. The terms of these credit arrangements are generally structured such that the benefits of early payments and the penalties of late payments are substantial (Petersen and Rajan (1994)).[12] Firms that extend their trade credit (i.e., pay late) suffer both pecuniary and reputational penalties, resulting in both higher cost financing than that associated with institutional lending and potential loss of future trade credit (Petersen and Rajan (1994, 1997)). Given the severity of the consequences, we identify firms in our sample that have paid late on trade credit as potentially distressed and firms that have high percentages (>50%) of late payments as distressed, and firms that have paid late on trade credit 100% of the time as severely distressed. Initially, we exclude the severely distressed firms from the sample and rerun previous regressions according to the specifications in regression equations (1) through (3). Next we exclude the distressed firms and repeat the analysis. Finally, we eliminate the potentially distressed firms and repeat.

[11] However, it may be the case that owners who pledge personal assets are still able to shelter personal assets in the event of firm bankruptcy through state-specific bankruptcy exemptions. Lin and White (2001) investigate the relationship between bankruptcy exemptions and the availability of credit, and provide a detailed breakdown of homestead and personal exemptions under state bankruptcy laws. Unfortunately, location specific information (including state) is classified and unavailable in SSBF, so we are unable to consider specific homestead and personal asset exemptions in our analysis.

[12] An example given by Smith (1987) includes a 10-2-30 term, where firms are given a 2 percent discount if the balance is paid in full within 10 days and no discount if paid in 30 days. By foregoing the discount in this example, the firm is essentially borrowing at an annual rate of 44.6 percent (Peterson and Rajan (1994)).

By eliminating distressed firms from the sample, we hope to show an overall better fit for the model, as well as improvement to the significance of both the traditional capital structure and personal risk tolerance coefficients.

IV. Results

4.A Univariate Results

We present descriptive statistics in Table I. The leverage ratios of our final sample (536 firms) have an intuitively pleasing range from 0 to 1 with a standard deviation of 0.309 and a mean and median of 0.356 and 0.305, respectively. Approximately 93.3% of the firm owners in our sample manage the day-to-day operations of their firm, while the mean age of the firm is 16.6 years. The average firm uses 2.7 financial institutions for their financing and three firm owners have declared bankruptcy in the previous 7 years (to survey date). The sample mean (median) of the categorical representation of the Dun & Bradstreet credit score is 4.2 (4) and ranges from 1 to 6, with 1 being the most risky and 6 being the least risky. The mean return on assets is approximately 1, the mean sales $1,644,423, and the mean number of employees is 20.

Table I here

Turning to personal risk characteristics, the mean and median age of the firm owner is 53 with a standard deviation of 10. Female owners represent approximately 18.3% of the sample, while the average (median) total net worth of the firm owners is $1,849,325 ($1,011,308). The average owner in our sample loans $1,744 to their firm. Approximately 93.1% of the firm owners in our sample use computers for business purposes, while the mean number of tasks using computer is 4.6. Over half (a fifth) of the firm owners have a college degree (graduate degree), and the average owner has 22 years of business experience. A little less than half of the firm owners pledge collateral or guarantee a loan, while less than 15% pledge personal assets.

Table II presents mean leverage ratios by various owner characteristic subgroups and reports *t*-test results that indicate the statistical significance between the mean values being compared. Comparisons among the subgroups for the full sample are presented in Panel A; comparisons between the subgroups by gender are reported in Panel B; and comparisons between owners who pledge collateral and those that do not are presented in Panel C.

Table II here

The results in Panel A reveal no significant difference between the mean leverage ratios of female and those of male owners. As discussed above, this may indicate that the male and female entrepreneurs/owners in our sample are equally risk tolerant/averse, however, a closer analysis in Panel B suggests that the female subsample is homogeneous while the male subsample is heterogeneous. Significant differences in the leverage ratios is observed for 9 of the 15 comparison variables among male firm owners, while only 2 comparison variables reveal

significant and consistent differences among female owners. With respect to male owners, the mean leverage ratio is 51.9% higher for computers users versus non-users, up to 49% higher for more sophisticated owners, 61.9% higher for those that pledge collateral, 63.4% higher for those that guarantee loans, and 23.4% higher for those that pledge personal assets. Conversely, the mean leverage ratio between males is lower for those with college degrees, graduate degrees, greater firm equity, and greater wealth exposure. Significant and consistent differences in leverage ratios between females are observed only for those that pledge collateral and guarantee loans. Similar to the intra-male comparison, mean leverage ratios of females that pledge collateral or guarantee loans are higher than those that do not (52.1% and 53.4% higher, respectively). The comparisons between males and females is interesting for the reason that we know it is not a simple comparison of the sexes, but rather it is the heterogeneity of the male subsample that allow us to see differences among gender.

Given that both intra-female and intra-male comparisions in Panel B reveal significant differences in mean leverage ratios between those that pledge collateral or guarantee a loan and those that do not, it is not surprising to find similar results in Panel A for the full sample. Mean leverage ratios are 60.1% higher for firm owners that pledge collateral and 61.7% higher for those that guarantee a loan. These differences are statistically significant at the 1% level. Mean leverage ratios for firm owners that pledge personal assets is 20.6% higher, but only marginally significant at the 10% level. Panel C of Table II breaks the sample up by pledgers and non-pledgers, and presents subgroup comparisons. While the mean leverage ratios for owners that pledge collateral are higher than non-pledgers for every single variable comparison, there is little variation within the pledger subsample and little variation within the non-pledger subsample. Only changes in firm equity are consistently positive and significant at the 1% level for both pledgers and non-pledgers, while changes in sophistication positively influence only the owners that pledge collateral. The most sophisticated (upper tercile) firm owners who pledge collateral have a mean leverage ratio 53.5% greater than the least sophisticated (lower tercile) firm owners that pledge collateral, and the moderately sophisticated (middler tercile) have a mean leverage ratio that is 29.7% greater than the least sophisticated. These differences are significant at the 1% level. Notwithstanding the few differences in the intra-group comparisons, Panel A and Panel C show us that, while there is a difference between pledgers and non-pledgers, there is little variation within each of these subgroups. This finding underscores the importance of controlling for collateral.

Finishing off Table II, Panel A shows that firm owners who use computers have 40.1% higher leverage ratio than non-computer users, a difference that is statistically significant at the 5% level. Among computer users, owners that use computers most extensively (upper tercile of sophisticated) have, on average, 48.2% higher leverage ratios than those that use computers the least (lower tercile). Similarly, the leverage ratios of moderate computer users (middle tercile) are 30.3% higher than those that use computers the least. Both differences are significant at the 1% level. More educated firm owners, as evidenced by a college degree or graduate degree, have lower leverage ratios on average, although the difference is only marginally statistically significant at the 10% level. Owners with greater firm equity and higher wealth exposure tend to

have lower leverage ratios, while home equity, other net worth, and total net worth do not appear to influence leverage. Similarly, the age of the owner and business experience do not appear to be significant factors for leverage.

The wealth exposure of firm owners is examined in more detail in Table III. It is clear from Panel A of Table III that owners with greater wealth exposure (lower inverse wealth exposure tercile) make more personal commitments on loans or lines of credit. Approximately 60% of the firm owners in the lower wealth exposure tercile pledge collateral and approximately 58.1% guarantee loans. This is in sharp contrast to the owners in the upper wealth exposure tercile where less than 38% pledge collateral or guarantee loans. Similarly, 17.9% of firm owners in the lower wealth exposure tercile pledge personal assets, while only 9.5% of owners in the upper wealth exposure tercile pledge personal assets. Because pledging of collateral, etc., allows firm owners to acquire more debt, the results suggest that relatively more diversified owners are also more risk averse.[13] This notion is further supported by Panel B of Table III where firm owners with more wealth exposure (lower and middle inverse wealth exposure terciles) have higher leverage ratios than firm owners with the least wealth exposure. This is true for both the firm owners that make personal commitments and for those that do not. For firm owners that make personal commitments, high wealth exposure firm owners have 34.9% greater leverage than low wealth exposure firms, a difference that is statistically significant at the 1% level. The result is consistent with the role of owner's risk tolerance (aversion), owners who are more (less) averse to risks are less (more) likely to invest a greater portion of own wealth into the business, i.e., they do (do not) diversify. They are also less (more) likely to pledge or guarantee with own remaining assets.

Table III here

Panel B of Table III also presents personal risk characteristics by inverse wealth exposure terciles for firm owners that make personal commitments and those that do not. It is interesting to note here that owners with college degrees and/or graduate degrees are more highly represented in the middle and upper inverse wealth exposure terciles (lower wealth exposure), regardless of whether they make personal commitments or not. Conversely, the age of the owner, business experience, sophistication, computer usage, and gender do not appear to be significant factors in explaining variations in wealth exposure.

4.B Multivariate Results

We present weighted least squares regression results in Table IV where the dependent variable is the ratio of total liabilities to total assets. Regression results for traditional capital structure determinants are reported in Column (1), personal risk characteristics in Column (2),

[13] However, a self-selection bias may be present as firms with less desirable balance sheets may be required to make personal commitments, while firm owners with substantial wealth may not require outside financing and thus are not required to make personal commitments. We address this possible endogeneous relationship below.

and the full model in Column (3). As the overarching goal of this paper is to explore the significance of individual characteristics in capital structure decisions, we begin by focusing on the explanatory power of the subset of variables. Based on the adjusted R-square, traditional capital structure determinants explain approximately 15% of the variability in the capital structure decisions of the single-owner firms. When personal risk characteristics are added to the model the adjusted R-square increases to 0.26, indicating that personal risk characteristics account for approximately 42.3% of the explained variation. These results suggest that owner characteristics are important when evaluating the capital structure of firms.

Table IV here

Based on Table IV, older firms tend to have lower leverage ratios. For every ten year increase in firm age, there is a corresponding 2.3% to 3.1% decrease in leverage, a difference that is significant at the 10% to 5% level, respectively. Firms with higher return on asset ratios also tend to have less leverage, where a 100 basis point increase in the profit to asset ratio results in a 4 basis point decrease in leverage, a change that is significant at the 1% level. The number of financial institutions used by the firms is positively related to leverage, where an increase of one financial institution corresponds to an increase of 3% to 4.1% in leverage. These results are significant at the 1% level. Similarly, firms that have higher sales tend to have higher leverage ratios. Firms within the retail trade industry and the transportation, communication, and utility industry are associated with higher leverage, however, the results are only marginally significant at the 10% level (The leverage of these firms may be underestimated (and thus, more significant) as some firms may use leasing as in retail).

Turning now to personal risk characteristics, Table IV reveals that the age of the owner, owner computer use, sophistication, business experience, and the act of pledging collateral are positively related to leverage, the results of which are mostly significant at the 1% level. For every 10 year increase in the age of the owner, there is a corresponding 4% increase in leverage. This result is contrary to expectations as the level of risk aversion has been shown to increase with age, such as in Bertrand and Schoar (2003), Hallahan, Faff, and McKenzie (2004), and Dohmen et al. (2005). Firm owners that use computers for business purposes have on average 10% higher leverage ratios, while firm owners that use computers more extensively have even higher leverage ratios, approximately 1.9% to 3.0% higher for each additional business related computer task. A 10 year increase in business experience corresponds to a 4.2% to 4.7% increase in leverage, suggesting that more experienced firm owners have more established sources for funding. Firms that pledge collateral have approximately 9% to 15% higher leverage ratios, indicating that the more risk tolerant owners could increase firm leverage by giving up some or all limited liability protection on personal wealth. Based on the economic significance of collateral and the possible endogeneous relationships discussed earlier, we explore the role of pledging collateral in more detail below.[14] Dollar amount of firm equity is inversely related to

[14] We report two-stage least squares regressions in Appendix B where collateral is instrumented by three subsets of variables and where the leverage ratio of firms is regressed on traditional capital structure determinants, personal

firm leverage, and this relation is significant at the 1% level. For every $100,000 increase in firm equity, there is a corresponding 2% decrease in firm leverage. It is consistent with the desire of risk averse owners to limit risk of loss of larger personal investment in the firm.

To check for robustness in results reported in Table IV, we eliminate potentially constrained firms and re-run the regressions. The new results are reported in Table V. When severely distressed (late payments on trade credit 100% of the time) and distressed (late payments on trade credit 50% or more) firms are eliminated from the sample, the magnitude and statistical significance of the coefficients on traditional capital structure determinants and personal risk characteristics remain nearly identical, and personal risk characteristics account for 40.7% and 38.5% of the explained variation in capital structure, respectively. When potentially distressed (having paid late on trade credit at least once) firms are dropped, the age of the firm loses significance, but all other coefficients remain statistically and economically significant and the personal risk characteristics account for 43.5% of the explained variation in capital structure.

Table V here

In Table VI we use weighted least squares to analyze the factors involved with pledging of collateral, guaranteeing, and pledging of personal assets to obtain requisite financing. Firm owners that pledge collateral or guarantee loans are associated with using more financial institutions, having higher sales, using computers for business purposes, and, to some extent, being more sophisticated and having more business experience. Firms in the insurance/real estate industry appear to be especially prone to pledging collateral, a result that is statistically significant at the 1% level. The coefficient on SIC insurance real estate ranges from .197 to .255, which indicates that firms in this industry are 19.7% to 25.5% more likely to pledge collateral, all else equal. Conversely, firm owners with college degrees are 9% to 11% less likely to pledge collateral or guarantee a loan, the results of which are significant at mostly the 5% level. Similarly, firm owners with graduate degrees are 10% to 11% less likely to pledge collateral. The decision to pledge personal assets is driven more by whether or not the firm owner is the day-to-day manager, the amount of equity in the firm, and whether or not the owner has previously made loans to their own firm. Firm owners that manage their own company are 17.2% to 19.5% less likely to pledge personal assets, a difference that is significant at the 5% to 1% level, respectively. Firm owners that have previously extended loans to their own company are approximately 4.7% more likely to pledge personal assets, a result that is significant at the 1% level, consistent with greater co-mingling of business and personal assets. Greater firm equity also increases the probability of pledging personal assets, where a $100,000 increase in

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risk characteristics, and the full model. The three instruments employed are 1) the net worth of the owner and owner equity in their primary home, 2) net worth of the owner and a categorical representation of the Dun & Bradstreet credit ranking, and 3) all three instruments. The three sets of instruments provide similar results, all of which mimic the results reported in Table IV. Based on Sargan statistics and corresponding p-values, the instrumental variables chosen are suitable.

firm equity corresponds to a 1.2% to 1.3% increase in the chance a firm owner pledges personal assets.

Table VI here

In Table VII, we report weighted least squares regressions on subsamples of firm owners based on whether or not they pledge collateral. The subsamples are approximately equal in size with 258 firm owners that pledge collateral and 278 that do not. For both subsamples, personal risk characteristics account for a substantial amount of the explained variation in capital structure of these firms. For the collateral pledging firms, personal risk characteristics account for 33.3% of the explained variation, and for the non-collateral pledging firms, they account for 60.0% of the explained variation. Similar to the results reported in Table IV, the leverage ratios of both pledgers and non-pledgers are positively related to sales and inversely related to their return on assets ratio and their amount of firm equity. Similar to the full sample regression in Table IV, but unique to pledgers, leverage ratios are inversely related to the age of the firm and positively related to the secondary manufacturing industry dummy and sophistication. Unique to non-pledgers, leverage is positively related to the number of financial institutions used, computer use, and business experience and is inversely related to owner loans to the firm and having a college degree. The coefficients on college degree range from -.088 to -.100 and are significant at the 5% and 1% level, respectively. This indicates that non-pledgers with college degrees tend to use up to 10% lower leverage than do non college degree holders. While similarities exist between the pledgers and non-pledgers and between these groups and the full sample, the differences reported above demonstrate the need to control for collateral, as is done in Tables IV and V. Overall, we show there are differences in the owners' characteristics to explain why firms choose to pledge personal assets or not.

Table VII here

V. Summary and Conclusion

Capital structure theory is a well studied discipline in finance. Much of the work in this area has concentrated on agency theory, asymmetric information, and bankruptcy and distress costs, while little work has focused on individual demographic or risk characteristics of firm owners. In this study, we show that owner characteristics contribute meaningfully to the explained variation in capital structure choices. Our results show that personal risk characteristics, when included with traditional capital structure determinants, account for 33% to 60% of the explained variation in capital structure choices. This is the first study to quantify the extent of individual owner effects and to provide support for incorporating personal risk characteristics as a fundamental component in traditional capital structure theory.

Our results show that firm leverage, as measured by total liabilities divided by total assets, is positively related to the owner age, business experience, sophistication, number of

financial institutions used by the owner, sales of the firm, and whether or not the owner uses computers for business purpose or pledges collateral. In addition, we that firm leverage is negatively related to the age of the firm and the ratio of return on assets. No significant differences are found between female and male owners, although substantial differences are observed between male owners, including an inverse relationship between education and leverage. An inverse relationship is also found between education and the choice to pledge collateral or guarantee loans, where more educated owners are less willing to make personal commitments. Moreover, less educated owners tend to have greater wealth exposure, make more personal commitments, and have higher leverage ratios.

Our study contributes to the growing body of literature that focuses on the effects of manager characteristics on corporate behavior and performance. While several studies have considered manager characteristics such as education and age, we are the first to examine and report the effects of a comprehensive set of individual demographic and personal risk characteristics, which allows us to quantify the extent to which individual owners and managers matter in capital structure decisions. Our results underscore the significance of the individual owner and indicate that capital structure theory can be bolstered accordingly.

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Table I: Descriptive statistics for determinants of capital structure
This table presents summary statistics for 536 (160 C and 376 S Corporations) single-owner firms. The variables include traditional capital structure determinants and socioeconomic and demographic characteristics used to explain the capital structure decisions of firm owners. Please refer to Appendix A for detailed descriptions of each variable.

	N	Mean	Median	25%	75%	Min	Max	SD
Lev ratio	536	0.356	0.305	0.055	0.608	0	1	0.309
Total assets	536	734830	214487	60000	770150	67	9502000	1299934
Total liabilities	536	323648	50500	5784	271832	0	6762000	755335
Owner managed	536	0.933	1	1	1	0	1	0.251
Age of firm	536	16.590	15	8	23	1	60	10.937
Number of finances	536	2.670	2	2	3	0	7	1.465
Indvl bankruptcy	536	0.006	0	0	0	0	1	0.075
D&B credit ranking	536	4.213	4	3	5	1	6	1.363
SIC wholesale trade	536	0.069	0	0	0	0	1	0.254
SIC retail trade	536	0.162	0	0	0	0	1	0.369
SIC mining construction	536	0.116	0	0	0	0	1	0.320
SIC primary mnfctrng	536	0.037	0	0	0	0	1	0.190
SIC scndry mnfctrng	536	0.058	0	0	0	0	1	0.234
SIC transp comm util	536	0.043	0	0	0	0	1	0.203
SIC insurance realestate	536	0.071	0	0	0	0	1	0.257
SIC business services	536	0.205	0	0	0	0	1	0.404
SIC profssnl services	536	0.239	0	0	0	0	1	0.427
ROA	536	1.007	0.186	0.007	0.752	-5.946	22.824	2.978
Sales	536	1644423	654610.5	221884	2000000	0	9931111	2235923
No. of employees	536	20	7	3	25	1	154	29
Age of owner	536	53	53	45	60	25	89	10
Female	536	0.183	0	0	0	0	1	0.387
Owner loan to firm	536	1744	0	0	0	0	100000	10039
Home equity	536	338961	200000	100000	400000	0	3000000	448494
Firm equity	536	406051	111688	31244	431990	0	5213720	744029
Other net worth	536	1112181	500000	150000	1100000	0	12000000	1816796
Total net worth	536	1849325	1011308	424287	2144837	142	12800000	2410526
Use computers	536	0.931	1	1	1	0	1	0.254
Sophistication	536	4.595	5	3	6	0	9	1.971
College degree	536	0.571	1	0	1	0	1	0.495
Graduate degree	536	0.222	0	0	0	0	1	0.416
Business exper.	536	21.987	20.5	14	30	0	62	11.430
Wealth exposure	536	20.166	2.910	1.067	8.941	0	433.163	63.055
Collateral	536	0.481	0	0	1	0	1	0.500
Guarantee	536	0.461	0	0	1	0	1	0.499
Personal assets	536	0.147	0	0	0	0	1	0.355
Collateral*net worth	536	3.892	0	0	2.682	0	85.520	11.904
Guarantee*net worth	536	3.798	0	0	2.360	0	85.520	11.911
Personal assets*net worth	536	0.621	0	0	0	0	25.411	2.175

Table II: Leverage ratios and personal risk tolerance
This table analyzes mean leverage ratios of different subsets of personal risk characteristic variables, including gender of firm owner, whether or not the owner extends loans to firm, whether or not the owner uses computers for business purposes, whether or not the owner has a college or graduate degree, and whether or not the owner pledges collateral, guarantees, or pledges personal assets to secure a loan or line of credit. Continuous variables are divided into terciles, including age of the owner, amount of equity in owner home and firm, other net worth of owner, total net worth of owner, sophistication of owner represented by the number of computer tasks used for business purposes, years of business experience of owner, and wealth exposure represented by (total net worth – firm equity)/total assets. Values reported for continuous variables are the mean leverage ratio for the given variable tercile. The leverage ratio is total liabilities divided by total assets. Panel A presents comparisons based on the entire sample of single-owner firms, Panel B bisects the sample by gender, and Panel C bisects the sample by whether or not the firm owner pledges collateral. ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. *t*-statistic in parentheses.

Panel A: Full Sample

	Lev ratio	Obs.		Lev ratio	Obs.
Male	0.362	438	Graduate degree	0.313	119
Female	0.329	98	No graduate degree	0.368	417
Diff. in means	0.033		Diff. in means	**-0.055***	
	(0.946)			**(-1.710)**	
Owner loan to firm	0.431	21	Pledge collateral	0.442	258
No owner loan to firm	0.352	515	Don't pledge collateral	0.276	278
Diff. in means	0.079		Diff. in means	**0.166*** **	
	(1.147)			**(6.437)**	
Use computers	0.363	499	Guarantee loan	0.448	247
Don't use computers	0.258	37	Don't gurantee loan	0.277	289
Diff. in means	**0.105** **		Diff. in means	**0.171*** **	
	(2.002)			**(6.631)**	
College degree	0.336	306	Pledge personal assets	0.416	79
No college degree	0.381	230	Don't pledge personal assets	0.345	457
Diff. in means	**-0.045***		Diff. in means	**0.071***	
	(-1.676)			**(1.899)**	

	Lev ratio			Diff. in means		
	Lower tercile (1)	Middle tercile (2)	Upper tercile (3)	(1) - (2)	(2) - (3)	(1) - (3)
Age of Owner	0.343	0.371	0.352	-0.028	0.019	-0.009
				(-0.889)	(0.581)	(-0.263)
Home equity	0.368	0.338	0.360	0.030	-0.022	0.008
				(0.924)	(-0.693)	(0.247)
Firm equity	0.432	0.309	0.325	**0.122*** **	-0.016	**0.106*** **
				(3.482)	(-0.572)	**(3.169)**
Other net worth	0.359	0.350	0.358	0.009	-0.008	0.002
				(0.277)	(-0.237)	(0.050)
Total net worth	0.372	0.346	0.348	0.026	-0.002	0.024
				(0.778)	(-0.061)	(0.732)
Sophistication	0.284	0.370	0.421	**-0.086*** **	-0.051	**-0.137*** **
				(-2.763)	(-1.320)	**(-3.226)**
Business exper.	0.338	0.359	0.371	-0.022	-0.011	-0.033
				(-0.666)	(-0.333)	(-1.011)
Wealth exposure	0.423	0.348	0.295	**0.076** **	0.052	**0.128*** **
				(2.417)	(1.580)	**(3.929)**

Table II – Continued

Panel B: Leverage ratios by gender

	Female		Male			Female		Male	
	Lev ratio	Obs.	Lev ratio	Obs.		Lev ratio	Obs.	Lev ratio	Obs.
Owner loan to firm	0.476	6	0.413	15	Pledge collateral	0.404	45	0.450	213
No owner loan to firm	0.319	92	0.360	423	Don't pledge collateral	0.265	53	0.278	225
Diff. in means	0.157		0.054		Diff. in means	**0.138****		**0.172*****	
	(1.139)		(0.671)			**(2.116)**		**(6.124)**	
Use computers	0.331	89	0.370	410	Guarantee loan	0.409	43	0.456	204
Don't use computers	0.302	9	0.243	28	Don't gurantee loan	0.266	55	0.279	234
Diff. in means	0.029		**0.126****		Diff. in means	**0.142****		**0.177*****	
	(0.255)		**(2.128)**			**(2.174)**		**(6.312)**	
College degree	0.331	55	0.337	251	Pledge personal assets	0.353	15	0.431	64
No college degree	0.326	43	0.394	187	Don't pledge personal assets	0.324	83	0.350	374
Diff. in means	0.006		**-0.057***		Diff. in means	0.029		**0.082****	
	(0.085)		**(-1.937)**			(0.309)		**(1.986)**	
Graduate degree	0.352	23	0.304	96					
No graduate degree	0.322	75	0.378	342					
Diff. in means	0.030		**-0.074****						
	(0.380)		**(-2.115)**						

	Female						Male					
	Lev ratio			Diff. in means			Lev ratio			Diff. in means		
	Lower tercile (1)	Middle tercile (2)	Upper tercile (3)	(1) - (2)	(2) - (3)	(1) - (3)	Lower tercile (1)	Middle tercile (2)	Upper tercile (3)	(1) - (2)	(2) - (3)	(1) - (3)
Age of Owner	0.333	0.304	0.338	0.028	-0.034	-0.005	0.361	0.373	0.350	-0.013	0.023	0.010
				(0.342)	(-0.396)	(-0.063)				(-0.366)	(0.640)	(0.288)
Home equity	0.381	0.321	0.284	0.060	0.037	0.097	0.366	0.344	0.375	0.021	-0.030	-0.009
				(0.724)	(0.461)	(1.203)				(0.587)	(-0.870)	(-0.251)
Firm equity	0.440	0.316	0.230	0.124	0.086	**0.210****	0.433	0.315	0.337	**0.117*****	-0.022	**0.096*****
				(1.363)	(1.352)	**(2.637)**				**(3.092)**	(-0.706)	**(2.607)**
Other net worth	0.372	0.282	0.328	0.090	-0.047	0.044	0.380	0.343	0.359	0.037	-0.016	0.021
				(1.052)	(-0.598)	(0.541)				(0.994)	(-0.434)	(0.610)
Total net worth	0.368	0.291	0.327	0.077	-0.036	0.041	0.365	0.358	0.361	0.007	-0.003	0.004
				(0.894)	(-0.474)	(0.495)				(0.178)	(-0.086)	(0.098)
Sophistication	0.217	0.386	0.291	**-0.170****	0.095	-0.075	0.300	0.366	0.446	**-0.066***	**-0.081***	**-0.147*****
				(-2.243)	(0.925)	(-0.740)				**(-1.945)**	**(-1.920)**	**(-3.143)**

Business exper.	0.366	0.291	0.327	0.075 (0.867)	-0.036 (-0.448)	0.040 (0.495)	0.332	0.373	0.380	-0.042 (-1.180)	-0.007 (-0.184)	-0.048 (-1.364)
Wealth exposure	0.398	0.318	0.272	0.080 (1.046)	0.046 (0.562)	0.126 (1.484)	0.436	0.351	0.297	**0.085**** **(2.492)**	**0.054** **(1.490)**	**0.139***** **(3.919)**

Table II – Continued

Panel C: Leverage ratios by pledge versus non-pledge of collateral

	Pledge collateral		Don't pledge collateral			Pledge collateral		Don't pledge collateral	
	Lev ratio	Obs.	Lev ratio	Obs.		Lev ratio	Obs.	Lev ratio	Obs.
Male	0.450	213	0.278	225	College degree	0.423	135	0.268	171
Female	0.404	45	0.265	53	No college degree	0.462	123	0.288	107
Diff. in means	0.046		0.013		Diff. in means	-0.040		-0.020	
	(0.960)		(0.274)			(-1.088)		(-0.542)	
Owner loan to firm	0.540	13	0.254	8	Graduate degree	0.374	47	0.273	72
No owner loan to firm	0.436	245	0.276	270	No graduate degree	0.457	211	0.276	206
Diff. in means	0.104		-0.022		Diff. in means	**-0.083***		-0.003	
	(1.248)		(-0.201)			**(-1.767)**		(-0.080)	
Use computers	0.442	251	0.283	248					
Don't use computers	0.435	7	0.216	30					
Diff. in means	0.007		0.067						
	(0.065)		(1.136)						

	Pledge collateral						Don't pledge collateral					
	Lev ratio			Diff. in means			Lev ratio			Diff. in means		
	Lower tercile (1)	Middle tercile (2)	Upper tercile (3)	(1) - (2)	(2) - (3)	(1) - (3)	Lower tercile (1)	Middle tercile (2)	Upper tercile (3)	(1) - (2)	(2) - (3)	(1) - (3)
Age of Owner	0.435	0.452	0.438	-0.017	0.014	-0.003	0.261	0.286	0.281	-0.025	0.005	-0.019
				(-0.376)	(0.296)	(-0.070)				(-0.563)	(0.122)	(-0.427)
Home equity	0.475	0.397	0.443	0.078	-0.046	0.032	0.279	0.258	0.287	0.021	-0.029	-0.008
				(1.715)	(-0.999)	(0.754)				(0.463)	(-0.648)	(-0.172)
Firm equity	0.542	0.413	0.370	**0.130***	0.043	**0.173***	0.376	0.233	0.217	**0.143***	0.016	**0.159***
				(2.765)	(1.132)	**(3.835)**				**(2.956)**	(0.449)	**(3.451)**
Other net worth	0.482	0.438	0.408	0.044	0.030	**0.074***	0.295	0.233	0.302	0.062	-0.069	-0.008
				(0.962)	(0.693)	**(1.678)**				(1.396)	(-1.601)	(-0.166)
Total net worth	0.477	0.460	0.388	0.017	**0.072***	**0.088***	0.295	0.251	0.281	0.045	-0.030	0.014
				(0.363)	**(1.684)**	**(1.965)**				(0.974)	(-0.709)	(0.314)
Sophistication	0.344	0.446	0.528	**-0.102***	-0.081	**-0.184***	0.251	0.288	0.284	-0.037	0.004	-0.033
				(-2.159)	(-1.636)	**(-3.235)**				(-0.920)	(0.068)	(-0.545)
Business exper.	0.469	0.400	0.454	0.069	-0.053	0.016	0.251	0.287	0.289	-0.036	-0.001	-0.038
				(1.556)	(-1.181)	(0.354)				(-0.813)	(-0.031)	(-0.855)

Table III: Wealth exposure and personal commitments

This table presents comparisons among wealth exposure terciles for single-owner firms. Wealth exposure terciles are formed and then observations are sorted by personal commitment versus no personal commitment, by guarantee versus no guarantee, and by pledge personal assets versus do not pledge personal assets. Wealth exposure is defined as (total net worth – firm equity)/total assets. A personal commitment is made if firm owner pledges personal or business assets, guarantees a loan, or cosigns on a loan or line of credit. A guarantee is made if firm owner guarantees or cosigns a loan or line of credit. Pledging personal assets entails firm owner pledging personal assets to secure a loan or line of credit. Panel A provides a breakdown by wealth exposure terciles for firm owners that pledge collateral, guarantee, and pledge personal assets and those that do not. Panel B provides further analysis between firm owners that make personal commitments and those that do not. ***, **, * indicate significance at the 1%, 5%, and 10% level, respectively. *t*-statistic in parentheses.

Panel A:

	Personal commitment	No personal commitment	Total	% personal commitment
Wealth exposure lower tercile	107	72	179	59.78%
Wealth exposure middle tercile	84	94	178	47.19%
Wealth exposure upper tercile	67	112	179	37.43%
Total	258	278	536	48.13%
	Guarantee	Don't Guarantee	Total	% that guarantee
Wealth exposure lower tercile	104	75	179	58.10%
Wealth exposure middle tercile	78	100	178	43.82%
Wealth exposure upper tercile	65	114	179	36.31%
Total	247	289	536	46.08%
	Pledge personal assets	Don't pledge personal assets	Total	% that pledge personal assets
Wealth exposure lower tercile	32	147	179	17.88%
Wealth exposure middle tercile	30	148	178	16.85%
Wealth exposure upper tercile	17	162	179	9.50%
Total	79	457	536	14.74%

Table III - Continued

Panel B**:**

	Make personal commitment						Don't make personal commitment					
	Wealth exposure terciles											
	Lower tercile (1)	Middle tercile (2)	Upper tercile (3)	(1) - (2)	(2) - (3)	(1) - (3)	Lower tercile (1)	Middle tercile (2)	Upper tercile (3)	(1) - (2)	(2) - (3)	(1) - (3)
Lev ratio	0.522	0.416	0.387	**0.106****	0.029	**0.135*****	0.314	0.271	0.241	0.043	0.030	0.073
				(2.580)	(0.631)	**(3.062)**				(1.022)	(0.679)	(1.579)
Age of owner	51.360	52.767	52.733				53.204	52.522	54.290			
Sophistication	5.349	4.977	4.640				4.398	4.033	4.258			
Business exper.	21.384	24.163	22.907				22.548	21.261	19.839			
Gender												
Female	14	13	18				18	12	23			
Male	72	73	68				75	80	70			
% Female	16.28%	15.12%	20.93%				19.35%	13.04%	24.73%			
Use computers												
Use computers	84	84	83				82	81	85			
Don't use computers	2	2	3				11	11	8			
% use computers	97.67%	97.67%	96.51%				88.17%	88.04%	91.40%			
College												
College degree	35	51	49				47	53	71			
No college degree	51	35	37				46	39	22			
% college degree	40.70%	59.30%	56.98%				50.54%	57.61%	76.34%			
Grad school												
Graduate degree	11	14	22				16	19	37			
No graduate degree	75	72	64				77	73	56			
% graduate degree	12.79%	16.28%	25.58%				17.20%	20.65%	39.78%			
Obs.	86	86	86				93	92	93			

Table IV: Leverage ratios on traditional capital structure and personal risk tolerance variables

This table reports regression results of firm leverage ratios on firm and individual characteristics for the entire sample (536) of single-owner C and S-Corporations. *Lev ratio*, total liabilities divided by total assets, is regressed over traditional capital structure variables, personal risk tolerance variables, and then on all of the variables. *Owner managed* is a dummy variable that equals one if the owner is responsible for day-to-day operations and zero otherwise; *Age of firm* is the firm age in years divided by 10; *Number of finances* is the number of financial institutions used by the firm; *Indvl bankruptcy* is a dummy variable that equals one if the owner has declared bankruptcy in the last seven years and zero otherwise; *D&B credit ranking* is a categorical representation of the Dun and Bradstreet rank credit score with 1 being most risky and 6 least risky; *SIC wholesale trade*, *SIC retail trade*, *SIC mining construction*, *SIC primary mnfctrng*, *SIC scndry mnfctrng*, *SIC transp comm util*, *SIC insurance realestate*, and *SIC business services*, are dummy variables based on the one-digit SIC codes; *ROA* is profit scaled by assets; S*ales* is the natural logarithm of firm sales; *No. of employees* is the number of employees in firm divided by 10; *Age of owner* is the age of owner in years divide by 10; *Female* is a dummy variable that equals one if the owner is female and zero otherwise; *Owner loan to firm* is the amount firm owner has lent to firm in tens of thousands. *Home equity* is the amount of equity owner has in home or primary residence in hundreds of thousands; *Firm equity* is the amount of equity owner has in firm in hundreds of thousands; *Other net worth* is the owner net worth not including equity in home and firm in hundreds of thousands; *Use computers* is a dummy variable that equals one if the owner uses computers for business purposes and zero otherwise; *Sophistication* is the number of tasks owner uses computer for business purposes; *College degree* is a dummy variable that equals one if the owner has a college degree and zero otherwise; *Graduate degree* is a dummy variable that equals one if owner has a graduate degree and zero otherwise; *Business exper* is business experience of owner in years divided by 10; *Wealth exposure* is (owner net worth minus firm equity)/total assets; and *Collateral* is a dummy variable that equals one if owner has pledged personal assets, guaranteed, or cosigned to secure a loan or line of credit. The following groups of variables are highly correlated and are thus orthogonalized to eachother: a) *Business exper, Age of firm,* and *Age of owner;* b) S*ales, No. of employees,* and *Firm equity;* c) *Home equity* and *Other net worth;* d) *Sophistication* and *Use computers;* and e) *College degree* and *Graduate degree. t*-statistics are in parentheses. *,**, and *** represent significance at the 10%, 5%, and 1%, respectively.

	VARIABLES	(1)	(2)	(3)
Traditional Capital Structure Determinants	Owner managed	0.009		-0.002
		(0.14)		(-0.03)
	Age of firm	**-0.031****		**-0.023***
		(-2.21)		**(-1.71)**
	Number of finances	**0.041*****		**0.030*****
		(4.12)		**(2.97)**
	Indvl bankruptcy	-0.183		-0.233
		(-0.79)		(-1.07)
	D&B credit ranking	-0.008		-0.008
		(-0.82)		(-0.76)
	SIC wholesale trade	0.028		0.039
		(0.52)		(0.70)
	SIC retail trade	**0.071***		**0.102****
		(1.66)		**(2.22)**
	SIC mining construction	0.030		0.045
		(0.63)		(0.88)
	SIC primary mnfctrng	0.029		0.006
		(0.36)		(0.07)
	SIC scndry mnfctrng	0.096		0.120
		(1.30)		(1.62)
	SIC transp comm util	**0.125***		**0.119***
		(1.83)		**(1.68)**
	SIC insurance realestate	0.075		0.011
		(1.41)		(0.22)
	SIC business services	0.006		-0.015
		(0.15)		(-0.36)
	ROA	**-0.040*****		**-0.041*****
		(-3.75)		**(-4.10)**
	Sales	**0.062*****		**0.053*****
		(5.30)		**(4.61)**
	No. of employees	-0.001		-0.005
		(-0.09)		(-0.58)
Personal Risk Characteristics	Age of owner		**0.039*****	**0.043*****
			(2.64)	**(2.97)**
	Female		-0.025	0.003
			(-0.77)	(0.10)
	Owner loan to firm		-0.013	**-0.033*****
			(-1.07)	**(-2.71)**
	Home equity		**0.007****	0.004
			(2.08)	(1.16)
	Firm equity		**-0.021*****	**-0.023*****
			(-5.92)	**(-6.80)**
	Other net worth		**0.002***	0.001
			(1.91)	(0.88)
	Use computers		**0.108****	**0.101****
			(2.28)	**(2.16)**
	Sophistication		**0.030*****	**0.019****
			(3.49)	(2.24)
	College degree		-0.044	-0.015
			(-1.43)	(-0.50)

	Graduate degree		**-0.056***	-0.030
			(-1.78)	(-0.83)
	Business exper		**0.047*****	**0.042****
			(2.60)	**(2.39)**
	Collateral		**0.151*****	**0.093*****
			(5.52)	**(3.36)**
	Constant	0.324***	0.188***	0.218**
		(3.96)	(4.08)	(2.35)
	Observations	536	536	536
	Adj. R-squared	0.15	0.16	0.26
	Explained variation by personal risk characteristics		42.3%	

Table V: Leverage ratios of unconstrained firms

This table reports regression results similar to Table IV where firm leverage ratios are regressed on firm and individual characteristics for single-owner C and S-Corporations; however, firms with various levels of financial constraint are eliminated from the sample. Financial constraint is determined by trade credit information on the firm. Severely distressed firms are defined as those that have paid late on trade credit 100% of the time. Distressed firms are defined as those that have paid late more than 50% of the time. Potentially distressed firms are defined as those that have paid late on trade credit. All variables are as defined in Table IV. *t*-statistics are in parentheses. *,**, and *** represent significance at the 10%, 5%, and 1%, respectively.

		Severely distressed firms eliminated			Distressed firms eliminated			Potentially distressed firms eliminated		
	VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Traditional Capital Structure Determinants	Owner managed	0.014		-0.001	0.002		-0.010	0.043		0.014
		(0.23)		(-0.02)	(0.03)		(-0.18)	(0.58)		(0.19)
	Age of firm	**-0.032****		**-0.027****	**-0.035****		**-0.032****	-0.021		-0.022
		(-2.29)		**(-1.98)**	**(-2.50)**		**(-2.31)**	(-1.30)		(-1.35)
	Number of finances	**0.038*****		**0.029*****	**0.036*****		**0.028*****	**0.035*****		**0.030****
		(3.84)		**(2.88)**	**(3.64)**		**(2.78)**	**(2.94)**		**(2.43)**
	Indvl bankruptcy	-0.169		-0.222	-0.166		-0.220	-0.154		-0.189
		(-0.74)		(-1.04)	(-0.74)		(-1.04)	(-0.66)		(-0.85)
	D&B credit ranking	-0.006		-0.005	0.000		0.000	-0.010		-0.005
		(-0.53)		(-0.51)	(0.03)		(0.03)	(-0.81)		(-0.39)
	SIC wholesale trade	0.032		0.047	0.027		0.040	0.056		0.074
		(0.58)		(0.85)	(0.49)		(0.70)	(0.87)		(1.12)
	SIC retail trade	**0.072***		**0.100****	**0.092****		**0.117****	0.052		0.098*
		(1.68)		**(2.16)**	**(2.14)**		**(2.51)**	(1.06)		(1.78)
	SIC mining construction	0.004		0.023	0.007		0.028	0.009		0.025
		(0.08)		(0.46)	(0.15)		(0.55)	(0.16)		(0.43)
	SIC primary mnfctrng	0.065		0.075	0.070		0.083	0.046		0.072
		(0.73)		(0.85)	(0.79)		(0.94)	(0.47)		(0.73)
	SIC scndry mnfctrng	0.074		0.110	0.068		0.103	0.075		0.081
		(0.91)		(1.36)	(0.76)		(1.17)	(0.71)		(0.78)
	SIC transp comm util	**0.134***		**0.125***	0.069		0.057	0.072		0.058
		(1.96)		**(1.74)**	(0.96)		(0.76)	(0.96)		(0.73)
	SIC insurance realestate	**0.090***		0.023	**0.096***		0.029	0.081		0.006
		(1.68)		(0.44)	**(1.81)**		(0.55)	(1.41)		(0.10)
	SIC business services	-0.000		-0.017	0.003		-0.011	-0.014		-0.025
		(-0.00)		(-0.43)	(0.08)		(-0.26)	(-0.33)		(-0.55)
	ROA	**-0.045*****		**-0.047*****	**-0.040*****		**-0.040*****	**-0.039*****		**-0.039*****
		(-4.23)		**(-4.53)**	**(-3.74)**		**(-3.91)**	**(-3.39)**		**(-3.47)**
	Sales	**0.065*****		**0.056*****	**0.062*****		**0.053*****	**0.060*****		**0.047*****
		(5.50)		**(4.84)**	**(5.31)**		**(4.58)**	**(4.68)**		**(3.71)**
	No. of employees	0.000		-0.005	0.003		-0.004	0.005		-0.001
		(0.04)		(-0.55)	(0.30)		(-0.43)	(0.44)		(-0.10)
Personal Risk Characteristics	Age of owner		**0.038****	**0.038****		**0.039****	**0.040*****		**0.028***	**0.031***
			(2.50)	**(2.57)**		**(2.52)**	**(2.62)**		**(1.66)**	**(1.82)**
	Female		-0.019	0.010		-0.016	0.015		0.002	0.037
			(-0.57)	(0.30)		(-0.49)	(0.45)		(0.06)	(1.00)
	Owner loan to firm		-0.013	**-0.033*****		-0.012	**-0.033*****		-0.006	**-0.030****
			(-1.07)	**(-2.68)**		(-1.03)	**(-2.71)**		(-0.48)	**(-2.10)**
	Home equity		**0.008****	0.005		**0.009****	**0.007***		**0.010****	**0.007***
			(2.15)	(1.35)		**(2.42)**	**(1.74)**		**(2.53)**	**(1.72)**
	Firm equity		**-0.021*****	**-0.024*****		**-0.020*****	**-0.022*****		**-0.022*****	**-0.025*****
			(-5.89)	**(-6.87)**		**(-5.42)**	**(-6.30)**		**(-5.07)**	**(-5.85)**
	Other net worth		**0.002****	0.001		**0.002***	0.001		**0.002****	0.002
			(1.98)	(0.99)		**(1.96)**	(1.03)		**(2.28)**	(1.39)
	Use computers		**0.101****	**0.088***		**0.099****	**0.082***		**0.114****	**0.096***
			(2.10)	**(1.86)**		**(2.03)**	**(1.71)**		**(2.16)**	**(1.81)**
	Sophistication		**0.030*****	**0.019****		**0.034*****	**0.022****		**0.028*****	**0.020****
			(3.37)	**(2.17)**		**(3.80)**	**(2.52)**		**(2.79)**	**(2.07)**
	College degree		-0.040	-0.011		-0.031	-0.009		**-0.067***	-0.033
			(-1.28)	(-0.35)		(-0.99)	(-0.27)		**(-1.89)**	(-0.92)
	Graduate degree		-0.049	-0.022		-0.041	-0.017		-0.053	-0.025
			(-1.55)	(-0.62)		(-1.30)	(-0.47)		(-1.50)	(-0.63)
	Business exper.		**0.053*****	**0.050*****		**0.046****	**0.047*****		**0.037***	**0.040***
			(2.90)	**(2.80)**		**(2.52)**	**(2.63)**		**(1.82)**	**(1.96)**
	Collateral		**0.147*****	**0.089*****		**0.145*****	**0.087*****		**0.135*****	**0.083****
			(5.28)	**(3.16)**		**(5.16)**	**(3.09)**		**(4.25)**	**(2.59)**
	Constant	**0.316*****	**0.188*****	**0.226****	**0.297*****	**0.180*****	**0.210****	**0.280*****	**0.144*****	0.160
		(3.80)	**(4.03)**	**(2.41)**	**(3.57)**	**(3.75)**	**(2.21)**	**(2.87)**	**(2.76)**	(1.45)
	Observations	518	518	518	499	499	499	412	412	412
	Adj. R-squared	0.16	0.16	0.27	0.16	0.16	0.26	0.13	0.14	0.23
	Explained variation by personal risk characteristics		40.7%			38.5%			43.5%	

Table VI: The role of collateral and personal guarantees
This table reports regression results of three alternative collateral definitions, *collateral, guarantee*, and *personal assets* on firm and individual characteristics for the entire sample (530) of single-owner C and S-Corporations. *Collateral* is a dummy variable that equals one if the firm owner was required to pledge personal assets, have a personal guarantee, cosigner, or other guarantor on a loan or line of credit, and zero otherwise. *Guarantee* is a dummy variable that equals one if the firm owner was required to have a personal guarantee, cosigner, or other guarantor on a loan or line of credit, and zero otherwise. *Personal assets* is a dummy variable that equals one if the firm owner was required to pledge personal assets to secure a loan or line of credit. All other variables are as defined in Table IV. *t*-statistics are in parentheses. *,**, and *** represent significance at the 10%, 5%, and 1%, respectively.

		Collateral			Guarantee			Personal assets		
	VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Traditional Capital Structure Determinants	Owner managed	0.076		0.066	0.117		0.128	**-0.172****		**-0.195*****
		(0.84)		(0.72)	(1.33)		(1.42)	**(-2.52)**		**(-2.81)**
	Age of firm	-0.014		-0.015	-0.014		-0.017	-0.011		-0.015
		(-0.65)		(-0.70)	(-0.66)		(-0.78)	(-0.67)		(-0.91)
	Number of finances	**0.111*****		**0.102*****	**0.120*****		**0.109*****	**0.029****		**0.025****
		(7.45)		**(6.54)**	**(8.22)**		**(7.19)**	**(2.58)**		**(2.10)**
	Indvl bankruptcy	0.350		0.389	0.358		0.382	0.408		**0.432***
		(1.00)		(1.12)	(1.05)		(1.13)	(1.54)		**(1.65)**
	D&B credit ranking	-0.001		-0.002	-0.008		-0.010	-0.001		0.003
		(-0.07)		(-0.10)	(-0.51)		(-0.63)	(-0.09)		(0.27)
	SIC wholesale trade	0.039		-0.039	-0.014		-0.059	0.011		-0.023
		(0.48)		(-0.44)	(-0.17)		(-0.69)	(0.18)		(-0.35)
	SIC retail trade	0.055		0.009	0.022		0.016	0.043		-0.032
		(0.85)		(0.12)	(0.35)		(0.23)	(0.88)		(-0.58)
	SIC mining construction	0.086		-0.006	0.068		0.014	-0.013		-0.067
		(1.19)		(-0.07)	(0.96)		(0.18)	(-0.24)		(-1.09)
	SIC primary mnfctrng	-0.094		-0.205	-0.084		-0.158	-0.025		-0.053
		(-0.78)		(-1.60)	(-0.71)		(-1.26)	(-0.27)		(-0.55)
	SIC scndry mnfctrng	0.090		-0.027	0.105		0.016	-0.119		**-0.194****
		(0.81)		(-0.23)	(0.97)		(0.14)	(-1.42)		**(-2.16)**
	SIC transp comm util	0.135		-0.013	0.120		0.021	-0.049		-0.106
		(1.31)		(-0.11)	(1.19)		(0.19)	(-0.63)		(-1.24)
	SIC insurance realestate	**0.255*****		**0.197****	0.114		0.063	**0.245*****		**0.238*****
		(3.16)		**(2.34)**	(1.45)		(0.76)	**(4.02)**		**(3.76)**
	SIC business services	0.093		0.011	**0.096***		0.044	-0.030		-0.052
		(1.59)		(0.16)	**(1.70)**		(0.69)	(-0.67)		(-1.06)
	ROA	**-0.031***		-0.022	-0.021		-0.012	**-0.028****		**-0.023***
		(-1.95)		(-1.34)	(-1.33)		(-0.75)	**(-2.36)**		**(-1.88)**
	Sales	**0.048*****		**0.045****	**0.048*****		**0.043****	0.004		0.004
		(2.72)		**(2.46)**	**(2.76)**		**(2.42)**	(0.30)		(0.26)
	No. of employees	0.013		0.014	0.018		0.016	0.001		0.003
		(0.88)		(0.92)	(1.26)		(1.09)	(0.05)		(0.25)
Personal Risk Characteristics	Age of owner		-0.011	0.012		-0.016	0.010		-0.007	-0.005
			(-0.48)	(0.53)		(-0.68)	(0.46)		(-0.41)	(-0.29)
	Female		-0.000	0.046		0.023	0.069		-0.029	-0.023
			(-0.00)	(0.88)		(0.45)	(1.36)		(-0.74)	(-0.59)
	Owner loan to firm		0.012	-0.008		0.002	-0.022		**0.048*****	**0.047*****
			(0.63)	(-0.43)		(0.11)	(-1.14)		**(3.45)**	**(3.17)**
	Home equity		0.003	-0.001		0.005	0.000		-0.001	0.001
			(0.50)	(-0.19)		(0.93)	(0.07)		(-0.27)	(0.19)
	Firm equity		**0.010***	0.009		0.009	0.008		**0.012*****	**0.013*****
			(1.78)	(1.58)		(1.57)	(1.40)		**(3.03)**	**(3.21)**
	Other net worth		**0.003***	-0.000		**0.004****	0.001		0.001	-0.001
			(1.96)	(-0.04)		**(2.46)**	(0.67)		(0.45)	(-0.75)
	Use computers		**0.287*****	**0.146***		**0.322*****	**0.181****		0.021	-0.045
			(3.84)	**(1.95)**		**(4.39)**	**(2.47)**		(0.39)	(-0.79)
	Sophistication		**0.034****	0.006		**0.039*****	0.012		0.012	0.001
			(2.50)	(0.46)		**(2.92)**	(0.93)		(1.22)	(0.09)
	College degree		**-0.110****	**-0.102****		**-0.105****	**-0.089***		-0.021	-0.044
			(-2.25)	**(-2.08)**		**(-2.18)**	**(-1.86)**		(-0.59)	(-1.20)
	Graduate degree		**-0.101****	**-0.113****		-0.078	-0.070		0.011	-0.023
			(-2.01)	**(-1.99)**		(-1.58)	(-1.27)		(0.31)	(-0.54)
	Business exper.		**0.063****	0.042		**0.053***	0.036		-0.009	-0.009
			(2.18)	(1.50)		**(1.90)**	(1.30)		(-0.42)	(-0.45)
	Constant	0.039	**0.173****	0.022	-0.022	0.091	-0.119	**0.262*****	**0.124****	**0.365*****
		(0.31)	**(2.35)**	(0.15)	(-0.19)	(1.25)	(-0.82)	**(2.79)**	**(2.29)**	**(3.25)**
	Observations	536	536	536	536	536	536	536	536	536
	Adj. R-squared	0.17	0.08	0.18	0.18	0.09	0.20	0.06	0.03	0.08

Table VII: Collateral versus non-collateral

This table reports regression results of firm leverage ratios on two subsamples, firms that have pledged personal assets, guaranteed, or cosigned to secure a loan or line of credit and firms that have not. All variables are as defined in Table IV. *t*-statistics are in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1%, respectively.

	VARIABLES	Collateral pledged sample			No collateral pledged sample		
		(1)	(2)	(3)	(4)	(5)	(6)
Traditional Capital Structure Determinants	Owner managed	-0.007		-0.012	0.024		0.063
		(-0.09)		(-0.16)	(0.26)		(0.71)
	Age of firm	**-0.068*** **		**-0.039***	-0.013		-0.018
		(-3.33)		**(-1.86)**	(-0.67)		(-0.95)
	Number of finances	0.010		0.013	**0.059*** **		**0.074*** **
		(0.89)		(1.15)	**(3.13)**		**(3.82)**
	Indvl bankruptcy	-0.241		-0.294	-0.176		-0.134
		(-0.95)		(-1.22)	(-0.43)		(-0.35)
	D&B credit ranking	-0.012		-0.002	-0.007		-0.008
		(-0.90)		(-0.17)	(-0.43)		(-0.54)
	SIC wholesale trade	-0.065		-0.037	0.065		0.029
		(-0.81)		(-0.45)	(0.88)		(0.37)
	SIC retail trade	0.019		0.010	0.090		**0.173** **
		(0.32)		(0.15)	(1.44)		**(2.55)**
	SIC mining construction	-0.077		0.005	0.086		0.066
		(-1.20)		(0.07)	(1.24)		(0.90)
	SIC primary mnfctrng	0.157		0.202	0.018		-0.065
		(1.15)		(1.50)	(0.18)		(-0.63)
	SIC scndry mnfctrng	**0.210** **		**0.219** **	-0.049		0.009
		(2.28)		**(2.27)**	(-0.44)		(0.08)
	SIC transp comm util	-0.034		0.013	**0.177***		0.122
		(-0.36)		(0.14)	**(1.83)**		(1.16)
	SIC insurance realestate	0.077		0.042	0.061		0.021
		(1.14)		(0.61)	(0.71)		(0.26)
	SIC business services	0.033		0.025	-0.013		-0.019
		(0.60)		(0.40)	(-0.24)		(-0.33)
	ROA	**-0.037** **		**-0.051*** **	**-0.031** **		**-0.024***
		(-2.24)		**(-3.04)**	**(-2.21)**		**(-1.72)**
	Sales	**0.097*** **		**0.100*** **	**0.032***		**0.030***
		(5.85)		**(5.76)**	**(1.86)**		**(1.80)**
	No. of employees	0.005		-0.006	-0.008		-0.012
		(0.42)		(-0.61)	(-0.48)		(-0.71)
Personal Risk Characteristics	Age of owner		**0.041***	0.025		0.032	**0.048** **
			(1.80)	(1.17)		(1.65)	**(2.32)**
	Female		-0.028	0.046		-0.043	-0.028
			(-0.57)	(0.94)		(-0.94)	(-0.62)
	Owner loan to firm		0.003	0.005		**-0.034***	**-0.085*** **
			(0.16)	(0.33)		**(-1.82)**	**(-4.31)**
	Home equity		0.003	-0.003		0.010*	0.006
			(0.53)	(-0.59)		(1.94)	(1.17)
	Firm equity		**-0.020*** **	**-0.023*** **		**-0.022*** **	**-0.020*** **
			(-4.61)	**(-5.44)**		**(-4.03)**	**(-3.64)**
	Other net worth		0.002	0.001		0.001	0.001
			(1.36)	(0.60)		(0.75)	(0.44)
	Use computers		0.068	0.021		**0.114** **	**0.114***
			(0.64)	(0.20)		**(2.02)**	**(1.94)**
	Sophistication		**0.043*** **	**0.027** **		**0.022***	0.014
			(3.69)	**(2.41)**		**(1.71)**	(1.10)
	College degree		0.038	**0.083***		**-0.100** **	**-0.088***
			(0.89)	**(1.95)**		**(-2.26)**	**(-1.90)**
	Graduate degree		-0.078	-0.019		-0.047	-0.050
			(-1.65)	(-0.35)		(-1.08)	(-1.01)
	Business exper.		0.020	0.034		**0.059** **	**0.047***
			(0.75)	(1.35)		**(2.40)**	**(1.84)**
	Constant	**0.558*** **	**0.388*** **	**0.448*** **	0.188	**0.190*** **	0.048
		(5.28)	**(3.63)**	**(2.99)**	(1.51)	**(3.44)**	(0.35)
	Observations	258	258	258	278	278	278
	Adj. R-squared	0.18	0.11	0.27	0.08	0.10	0.20
	Explained variation by personal risk characteristics		33.3%			60.0%	

Appendix A: Variable definitions

	Variable	Definition
Leverage Ratio		
	Lev ratio	total liabilities/total assets
	Total assets	total assets of firm
	Total liabilities	total liabilities of firm
Traditional Capital Structure		
Agency Costs	**Owner managed**	binary variable equal to one if owner responsible for day-to-day operations of firm
Asymmetric Information	**Age of firm**	age of firm in years
	Number of finances	number of financial institutions used by firm
Bankruptcy/Distress Costs	**Indvl bankruptcy**	binary variable equal to one if owner declared bankruptcy in last seven years
	D&B credit ranking	Dun and Bradstreet credit ranking (categorical); 1 most risky, 6 least risky
	1-digit SIC	traditional one-digit industry SIC code
	ROA	return on assets: profit scaled by firm assets
	Sales	natural logarithm of annual sales of firm
	No. of employees	total number of employees
Personal Risk Characteristics		
Measures of Risk	**Age of owner**	age of owner
	Female	binary variable equal to one if owner is female
	Owner loan to firm	money lent to firm by owner
	Home equity	owner equity in primary residence
	Firm equity	owner equity in firm
	Other net worth	owner equity excluding equity in firm and primary residence
	Total net worth	total equity of owner
Ways to Reduce Risk	**Use computers**	binary variable equal to one if firm uses computers
	Sophistication	number of computer related tasks used by firm
	College degree	binary variable equal to one if owner has college degree
	Graduate degree	binary variable equal to one if owner has graduate degree
	Business exper.	business experience of owner in years
	Wealth exposure	(total net worth - firm equity)/total assets
	Collateral	binary variable equal to one if owner pledged collateral
	Guarantee	binary variable equal to one if owner guaranteed loan
	Personal assets	binary variable equal to one if owner pledged personal assets

Appendix B: Endogeneity of Collateral

This table reports two-stage least squares regressions of firm leverage ratios on traditional capital structure determinants and personal risk characteristics. Variables are measured as in Table IV. Collateral is instrumented using owner net worth, owner equity in home, and a categorical representation of the Dun & Bradstreet credit ranking. Three sets of instrumental-variables regressions are employed: (1) owner net worth and owner equity in home, (2) owner net worth and Dun & Bradstreet credit ranking, and (3) owner net worth, owner equity in home, and Dun & Bradstreet credit ranking.

		IV Net worth, home equity		IV Net worth, D& B credit rnkg		IV Net worth, home equity, D& B credit rnkg	
	COEFFICIENT	(1)	(2)	(3)	(4)	(5)	(6)
Traditional Capital Structure Determinants	Owner managed		-0.001		-0.006		-0.006
			(-0.01)		(-0.10)		(-0.10)
	Age of firm		-0.021		**-0.026****		**-0.024***
			(-1.55)		**(-1.98)**		**(-1.84)**
	Number of finances		**0.030*****		**0.029*****		**0.029*****
			(2.94)		**(2.92)**		**(2.88)**
	Indvl bankruptcy		-0.239		-0.230		-0.236
			(-1.10)		(-1.06)		(-1.09)
	D&B credit ranking		-0.009				
			(-0.89)				
	SIC wholesale trade		0.036		0.043		0.041
			(0.64)		(0.79)		(0.74)
	SIC retail trade		**0.104****		**0.103****		**0.105****
			(2.26)		**(2.24)**		**(2.29)**
	SIC mining construction		0.050		0.040		0.045
			(0.99)		(0.79)		(0.90)
	SIC primary mnfctrng		0.003		0.010		0.008
			(0.04)		(0.13)		(0.10)
	SIC scndry mnfctrng		**0.129***		0.119		**0.128***
			(1.74)		(1.60)		**(1.73)**
	SIC transp comm util		**0.121***		0.115		0.116
			(1.71)		(1.63)		(1.64)
	SIC insurance realestate		0.012		0.008		0.008
			(0.22)		(0.16)		(0.15)
	SIC business services		-0.014		-0.016		-0.015
			(-0.33)		(-0.40)		(-0.37)
	ROA		**-0.041*****		**-0.041*****		**-0.041*****
			(-4.06)		**(-4.09)**		**(-4.04)**
	Sales		**0.055*****		**0.052*****		**0.054*****
			(4.84)		**(4.56)**		**(4.79)**
	No. of employees		-0.005		-0.005		-0.004
			(-0.50)		(-0.50)		(-0.40)
Personal Risk Characteristics	Age of owner	**0.037****	**0.042*****	**0.039*****	**0.041*****	**0.037****	**0.041*****
		(2.50)	**(2.95)**	**(2.64)**	**(2.91)**	**(2.50)**	**(2.86)**
	Female	-0.026	0.005	-0.025	0.001	-0.026	0.002
		(-0.78)	(0.15)	(-0.77)	(0.03)	(-0.78)	(0.07)
	Owner loan to firm	-0.014	**-0.034*****	-0.013	**-0.032*****	-0.014	**-0.032*****
		(-1.16)	**(-2.78)**	(-1.07)	**(-2.62)**	(-1.16)	**(-2.68)**
	Firm equity	**-0.020*****	**-0.023*****	**-0.021*****	**-0.024*****	**-0.020*****	**-0.023*****
		(-5.67)	**(-6.70)**	**(-5.92)**	**(-6.91)**	**(-5.67)**	**(-6.81)**
	Other net worth	0.002*	0.001	0.002*	0.001	0.002*	0.001
		(1.85)	(0.79)	(1.91)	(0.90)	(1.85)	(0.80)
	Use computers	**0.113****	**0.105****	**0.108****	**0.104****	**0.113****	**0.108****
		(2.38)	**(2.23)**	**(2.28)**	**(2.21)**	**(2.38)**	**(2.30)**
	Sophistication	**0.031*****	**0.019****	**0.030*****	**0.019****	**0.031*****	**0.020****
		(3.56)	**(2.27)**	**(3.49)**	**(2.27)**	**(3.56)**	**(2.31)**
	College degree	-0.036	-0.009	-0.044	-0.016	-0.036	-0.010
		(-1.18)	(-0.31)	(-1.43)	(-0.53)	(-1.18)	(-0.33)
	Graduate degree	-0.051	-0.026	**-0.056***	-0.031	-0.051	-0.028
		(-1.61)	(-0.74)	**(-1.78)**	(-0.87)	(-1.61)	(-0.78)
	Business exper.	**0.047*****	**0.042****	**0.047*****	**0.041****	**0.047*****	**0.041****
		(2.61)	**(2.40)**	**(2.60)**	**(2.36)**	**(2.61)**	**(2.36)**
	Home equity			**0.007****	0.004		
				(2.08)	(1.25)		
	Collateral	**0.152*****	**0.093*****	**0.151*****	**0.093*****	**0.152*****	**0.093*****
		(5.55)	**(3.35)**	**(5.52)**	**(3.36)**	**(5.55)**	**(3.35)**
	Constant	**0.184*****	**0.215****	**0.188*****	**0.194****	**0.184*****	**0.187****
		(3.98)	**(2.32)**	**(4.08)**	**(2.22)**	**(3.98)**	**(2.14)**
	Observations	536	536	536	536	536	536
	Over ID test	4.380	1.494	0.409	0.683	4.785	2.331
	(p-values)	(0.112)	(0.474)	(0.815)	(0.711)	(0.188)	(0.507)