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The Security Issue Decision: Evidence from Small Business Investment Companies

Elijah Brewer III, Hesna Genay, William E. Jackson III, and Paula R. Worthington

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Elijah Brewer III
Federal Reserve Bank of Chicago

Hesna Genay
Federal Reserve Bank of Chicago

William E. Jackson III
Kenan-Flagler Business School
University of North Carolina - Chapel Hill

Paula R. Worthington
Federal Reserve Bank of Chicago

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Using a unique transactions-level dataset, this paper examines the investment choices of small business investment companies (SBICs), which are private venture capital firms licensed and regulated by the U.S. Small Business Administration (SBA). SBICs make debt and equity investments in small businesses, and we seek to explain their security choices. We focus on factors suggested by asymmetric information and contracting theories of security choice. Overall, our results are consistent with the predictions of contracting theory, although certain aspects of our results also support asymmetric information models. We find that projects generating tangible assets are more likely to be financed with debt than nondebt securities, consistent with contracting cost theories. We also find that repeat financings are more likely to be debt than are initial transactions between a particular small business-SBIC pair, which we interpret as evidence consistent with asymmetric information models. In addition, we find that increased firm risk generally decreases the probability of using debt, as do high levels of growth opportunities. Finally, we show that the characteristics of the SBIC providing the funding are important correlates of security choice. SBICs using higher amounts of funds or guarantees from the SBA are less likely to provide debt financing than other SBICs, while SBICs that are organized as partnerships or affiliated with banking organizations are less likely to provide debt financing than other SBICs.

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I. Introduction

How do firms finance their investment projects? How do investment firms and other financial intermediaries invest in the projects chosen by these firms? Some firms fund projects by issuing equity, others by issuing debt. Since Modiagliani and Miller's (1958) seminal work demonstrating the conditions under which a firm's value is not affected by its choice between debt and equity, research has focused on establishing analytical and empirical determinants of a firm's capital structure and its financing choice decision.[1] In this paper, we examine the empirical implications of two sets of models: contracting cost and asymmetric information models.[2] To do this, we analyze a unique, transactions-level dataset describing the investment choices made by small business investment companies (SBICs), which are financial intermediaries licensed by the Small Business Administration that make debt and equity investments in small businesses.

We report several results in this paper. First, we find that business projects that generate tangible assets and allow little managerial discretion tend to be funded with debt rather than nondebt securities. This result is consistent with the agency cost (contracting cost) view that projects that are heavily weighted toward tangible assets minimize the ability of owner/managers to shift funds to riskier projects. Second, we find that repeat transactions, in which an SBIC funds a particular small firm for a second or subsequent time, are much more

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[1]Recent empirical studies include Smith and Watts (1992) and Jung, Kim, and Stulz (1996). For an excellent review of the agency theory and asymmetric information literature, see Harris and Raviv (1992).

[2]We do not consider two other classes of models, tax-based models and timing models. See Jung et. al (1996) and DeAngelo and Masulis (1980).

likely to be debt transactions than are initial fundings. This is consistent with the view that information asymmetries are most pronounced for firms the first time they receive funds from an investor.

Our other empirical findings generally offer additional support for agency cost models: firms in industries with high growth opportunities are less likely to issue debt, and firms with high expected costs of financial distress (e.g., younger firms or firms with volatile earnings) are less likely to issue debt. One result that conflicts with some previous research is that firm size and the probability of issuing debt are negatively correlated: large firms are less likely to issue debt than small firms. We believe this primarily reflects the possibility that larger firms obtain their debt finance from other, non-SBIC sources, though it may also be consistent with asymmetric information models. We also find that firms in industries with high liquidity are less likely to use debt, which may be consistent with some asymmetric information model implications. Finally, we consider the roles played by investor (SBIC) characteristics in security issue choice. We find that highly leveraged SBICs and those that are affiliated with nonbank organizations are more likely to provide debt financing than other investment companies.

The rest of this paper is organized as follows. Section II discusses two theoretical explanations of security issue choice and Section III presents our empirical specification. Section IV describes the data. Section V provides estimates of several security issue choice models, and Section VI presents concluding remarks.

II. The determinants of an SBIC's security choice

What determines the type of security used by an SBIC to finance the investment project of a small firm? In particular, what characteristics of the project or the small firm affect whether an SBIC becomes a creditor or a shareholder in the small firm? We focus on the implications of contracting and asymmetric information models to develop testable hypotheses related to these research questions.

II.A. Contracting models

Contracting models of security issue choice are based on the recognition that conflicts of interest may arise between classes of firms' claimants (Jensen and Meckling, 1976). In particular, owners and managers may have different objectives, and it may be costly for owners to monitor managers to ensure that firm value is maximized. Similarly, owners and debtholders of a firm, who hold claims with different pay-off structures, may have conflicting incentives regarding how the firm's assets should be deployed. Models based on agency theory imply that a firm's optimal capital structure reflects a tradeoff between these contracting, or agency, costs of issuing debt and equity.

In these models, the agency costs of debt and equity vary with a firm's leverage. Owner-manager conflicts become less severe as leverage increases, since scheduled debt payments restrict the amount of "free cash flow" available to managers, limiting their ability to invest in value-reducing projects (Jensen, 1986; Stulz, 1990). Furthermore, debt can resolve conflicts between shareholders and managers with respect to liquidation decisions by giving the debtholders the right to liquidate if cash flows are poor (Harris and Raviv, 1990). In contrast to owner-manager conflicts, owner-debtholder conflicts increase as leverage

increases. As leverage rises, equity holders face stronger incentives to invest in riskier projects (the asset substitution issue discussed by Jensen and Meckling, 1976). Furthermore, increases in leverage increase the likelihood of financial distress, hence the expected cost of bankruptcy, thus depressing firm value.[3] Equity holders also may forego positive net present value (NPV) projects as leverage and likelihood of bankruptcy increase, because the benefits of the investment are more likely to accrue to debtholders (Myers, 1977). Agency models typically predict that security issue choice is made to balance these opposing effects of leverage on firm value.

II.B. Asymmetric information models

In asymmetric information models, a firm's insiders possess information about the quality and profit opportunities of the firm that is not available to outsiders, affecting both the price and the quantity of funds available to firms. Because outside investors cannot distinguish between high and low quality firms, they demand a "lemons' premium" as in Akerlof (1970). Although the values of both equity and risky debt are sensitive to the degree of asymmetric information problems a firm faces, the value of equity, and hence the lemons' premium on equity, is particularly sensitive. These models, often called "pecking order" models, imply that firms face a financing hierarchy, in which using internal funds is preferred to issuing low-risk debt, which in turn is preferred to issuing high-risk debt and equity (see Myers, 1984; and Myers and Majluf, 1984).[4] Furthermore, these models imply that, all else

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[3]This, of course, is true in other, non-agency cost models of financial structure.

[4]Other studies, extending the framework in Myers and Majluf (1984), however, conclude that asymmetric information need not imply that firms have a preference for issuing straight debt when they have a richer set of financing choices, such as issuing and retiring securities

equal, more information problematic firms are more likely to issue debt. In contrast, in other models, investors may restrict the quantity of funds available to firms. Because investors cannot distinguish or price discriminate between high and low quality borrowers, they set the interest rate so that there is excess demand for funds and some borrowers are rationed (Stiglitz and Weiss, 1981; Fazarri, Hubbard, and Petersen, 1988; Calomiris and Hubbard, 1990). In this latter class of models, more information problematic firms are less likely to issue debt. Hence, the implications of adverse selection-based models of security issue choice depend on whether the quantity or the price effect of asymmetric information dominates.[5]

Another class of asymmetric information models implies that issuing debt is a signal of high quality. For instance, in Ross (1977) and Heinkel (1982) owner/managers know the true distribution of firm returns, but outside investors do not. Since managers benefit if firm's securities are more highly valued by the market, but are penalized if the firm goes bankrupt, they signal the quality of the firm by issuing debt. Therefore, signaling models suggest that firm characteristics that are positively correlated with quality would also be positively correlated with the probability of issuing debt.

II.C. Summary

Contracting cost models emphasize conflicts of interest between a firm's claimants, and asymmetric information models emphasize the differences in knowledge between a firm's insiders and outsiders. Factors influencing the likelihood or expected costs of firm financial

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simultaneously (Brennan and Kraus, 1987; Noe, 1987).

[5]Smith and Watts (1992) also note that pecking order models have few testable cross-sectional implications for firms' capital structure.

distress can be considered in either framework. Anything which raises the costs incurred in a bankruptcy or the likelihood of bankruptcy's occurrence will raise the cost of debt relative to equity. In our empirical work below, we consider factors that measure firm risk, as well as those related to conflicts of interest and the extent of information asymmetries.

III. Empirical model and specification

III.A. Empirical considerations

We begin with the following empirical model of security issue choice. Let $V^D_i(X_i)$ denote the expected value of firm i when it issues debt, where V depends on a vector of firm and project characteristics X_i. Let $V^E_i(X_i)$ denote the corresponding expected value of firm i when it issues equity. The firm issues debt if

$$V^D_i(X_i) \geq V^E_i(X_i)$$

and issues equity otherwise.

Let y^*_i denote the net benefit of issuing debt, defined as

$$y^*_i = V^D_i(X_i) - V^E_i(X_i) + \epsilon_i$$

where ϵ_i is an i.i.d. error term. We do not observe y^*_i ; instead we observe whether a firm issues debt or equity. Let $y_i = 1$ if the firm issues debt, 0 otherwise. Then, $y_i = 1$ if $y^*_i \geq 0$, and $y_i = 0$ if $y^*_i < 0$. Our empirical model is then given by

$$Prob(y_i=1) = Prob(y^*_i \geq 0) = Prob(\epsilon_i \geq -X_i\beta).$$

We assume that ϵ_i follows the logistic distribution. As a result, we can rewrite our empirical model as

$$Prob(y_i = 1) = \frac{\exp(X_i\beta)}{(1+\exp(X_i\beta))}. \quad (1)$$

Because we do not estimate a structural model of security issue choice and other policies of small firms and SBICs, we recognize that equation (1) is a reduced-form equation and that we cannot interpret the estimated coefficients as structural ones. Instead, we interpret the coefficients of equation (1) as partial correlations that shed light on the theory of security issue choice.

Our binomial choice model is dictated by data availability. That is, we have observations only on firms who obtained SBIC fundings, not those who used internal funds, borrowed from banks, raised equity capital elsewhere, and so on. Estimation of this binomial logit model implicitly relies on the assumption of the independence of irrelevant alternatives, which implies that the odds ratio of choosing debt over nondebt is constant, regardless of the inclusion or exclusion of other choices in the model. As discussed by Maddala (1983, pp. 59-62), this assumption is fairly benign when the other choices are truly independent, but is less so when the other choices are close substitutes for the ones we consider.[6]

III.B. Independent variables

Following our discussion on the determinants of SBICs' security choice in section II, we can group our explanatory variables into several categories. This section defines our variables and discusses our expectations about their correlation with the probability of issuing debt.

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[6]Other studies of security issue choice confront the same problem. For example, Jung, Kim, and Stulz (1996) examine the debt and equity issue decisions of firms, without considering firms who borrowed privately or used internal funds over the same time period.

Ease of monitoring and asset substitution According to agency theory, firms with few opportunities to substitute risky assets for safe ones will have less severe debtholder-shareholder conflicts. We measure the ease of monitoring the small firm and the ease of asset substitution by the small firm by several variables: the firm's intended use of funds; an indicator variable for whether the transaction is a repeat transaction (same SBIC-small business pair); the firm's organizational form; the firm's proximity to its funding SBIC; the average industry ratio of research and development expenditures to sales; and the average industry ratio of intangible assets to total assets.

How a small firm intends to use the funds it receives from an SBIC is likely to be an important determinant of an SBIC's security choice. We are able to identify ten categories of intended use of funds: operating capital, research and development, marketing, acquisition of existing businesses, land acquisition, new building or plant construction, plant modernization, acquisition of machinery or equipment, debt consolidation, and other. Intended projects such as research and development, marketing, and the acquisition of existing businesses are risky activities that are difficult to monitor and allow owner/managers a great deal of discretion over the disbursement of funds, making it easier to substitute risky assets. Furthermore, these assets are not easily redeployable in alternative uses and have low liquidation value; thus, we would expect these projects to be financed with nondebt securities (Williamson, 1988; Schleifer and Vishny, 1992). On the other hand, plant modernization, new building or plant construction, consolidation of debts, acquisition of machinery, and land acquisition are activities that allow little management discretion. Furthermore, these activities (with the possible exception of consolidation of debt obligations) are associated with tangible assets

that can be pledged as collateral in debt issues or can be redeployed in other firms or industries in case of liquidation. Consequently, both the agency costs and expected costs of financial distress coming from debt are likely to be low, implying a higher probability of using debt.

Our indicator variable for repeat transactions is a measure of the cost of monitoring and the extent of information asymmetries between the SBIC and the small firm. Previous research indicates that the terms and even availability of credit for small businesses can vary with the strength of the relationship between lender and borrower (Petersen and Rajan, 1994; Berger and Udell, 1995). If an SBIC has provided funding to a small firm previously, then it already has some information on the firm, which would reduce the extent of information asymmetries. This implies that the "lemons' premium" on the firm's risky assets, particularly equity, would be lower for repeat than for initial fundings, lowering the likelihood that firm would issue debt. On the other hand, if availability of more information eases the quantity rationing of debt, then the probability of issuing debt would be higher for repeat financings.[7]

We expect proprietorships to use debt more often than partnerships or corporations. Shareholders of corporations and limited partners of firms have limited liability against losses, whereas general partners and owners of sole proprietorships have unlimited liability. Consequently, shareholder-creditor conflicts are more likely among corporations and limited partners than they are for general partners and sole proprietorships, and corporations and

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[7]Gompers (1995b) views a related variable, the duration between repeated venture capital financings of a firm, as endogenous: in particular, he argues that venture capitalists are likely to "stage" their investments as a monitoring mechanism, especially for firms facing high growth opportunities, asset specificities, etc. In this paper, we treat our repeat vs. initial fundings variable as an exogenous variable for security issue choice.

partnerships may be more likely to finance their projects with nondebt.[8]

Our indicator variable for geographical proximity between the small business and the SBIC is motivated by Lerner (1995), who finds that venture capitalists are more likely to have board representation in a firm if the firm is geographically close. If monitoring costs are fixed per financing and vary by geographical proximity of the SBIC, and if monitoring costs do not differ according to whether debt or nondebt is used, then the coefficient may be positive, reflecting the fact that most debt financings are smaller than nondebt financings in our sample (see table 1 below). Hence, fixed monitoring costs are spread out over a larger size deal when security issue choice is nondebt as compared to debt. However, if monitoring costs differ by security type, then the sign of the coefficient on this variable is ambiguous.

We expect the coefficients in equation (1) on the ratio of research and development (R&D) to total sales and the ratio of intangible assets to total assets to be negative, since firms in industries with high values of these variables may be less attractive to debt investors seeking to avoid potential monitoring problems. Furthermore, the assets of firms with high R&D expenses or high levels of intangible assets may be more specific to those firms or industries, reducing their liquidation value, hence making debt more expensive to issue. Note that this is also consistent the signaling models discussed in section II; that is, to the extent that high quality firms would have lower probabilities of bankruptcy and higher levels of tangible assets, signaling models imply that these firms would be more likely to issue debt.

Growth opportunities As noted in section II, agency models suggest a negative

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[8]Of course, it seems likely that corporations suffer from more severe owner/manager conflicts than proprietorships and partnerships do, which works in the opposite direction in terms of the probability of using debt. We think it unlikely this effect will dominate.

correlation between growth opportunities and the likelihood of using debt. For firms with high growth opportunities, the cost of restricting managerial discretion is relatively high; the management may not have sufficient funds or flexibility to invest in profitable projects (Stulz, 1990). Conflicts between shareholders and creditors over the exercise of growth options and the underinvestment problem are also likely to be greater (Myers, 1977). Therefore, firms with high growth opportunities are more likely to finance their investments with equity than debt. Signaling models, however, predict the opposite sign: If high quality firms have more growth opportunities than low quality firms, these models imply that probability of issuing debt is positively correlated with growth opportunities. Following Smith and Watts (1992), Barclay and Smith (1995a and 1995b), Jung et. al (1996), and others, we measure growth opportunities of firms with the average industry ratio of market value to book value of assets.

Firm risk (expected costs of financial distress) As discussed in section II, any factor that increases the expected losses in bankruptcy or financial distress raises the cost of debt, hence is likely to decrease the probability of using debt in equation (1). We use several measures of firm risk: firm age, firm size, and average industry measures of profitability, earnings volatility, and liquidity.[9]

We rely on previous research to motivate inclusion of firm age and firm size. Firm size and age may be related to security issue choice in several ways. Young, small firms are more likely to fail, *ceteris paribus*, than old, large ones. Further, young firms with little

[9]Another variable that is potentially important in security issue choice is a firm's capital structure. Lack of data on this variable precludes us from including it in our analysis; however, previous studies, such as Jung et. al. (1996) and MacKie-Mason (1990), find that capital structure is not a significant correlate of security issue choice.

reputational capital may take on riskier projects (Diamond, 1991), and large firms may be more diversified, hence less prone to failure, than small firms.[10] Consequently, young, small firms may have higher expected costs of financial distress, implying a lower likelihood of issuing debt. The implications of asymmetric information models depend on the relative magnitudes of price and quantity rationing effects. If small or young firms are more information problematic, the quantity rationing effect would imply that these firms are less likely to issue debt. On the other hand, higher lemons' premium on risky securities of these firms would imply that they are more likely to issue debt. Furthermore, if size and quality are positively correlated, then larger firms may signal their quality by issuing debt. We measure firm size by the total number of employees, which is reported as grouped data. We construct seven indicator variables, each of which takes on a value of one if a firm falls into the size category associated with that variable, zero otherwise. The excluded category is the largest size class (more than 500 employees).

Our other bankruptcy risk measures are the industry profitability and volatility measures. We expect profitability to be positively correlated with the likelihood of debt financing; if a firm is profitable, the risk of being unable to meet its debt obligations is smaller. Furthermore, profitability and quality are positively correlated. Therefore, both agency and signaling models would imply a positive relationship between profitability and the

[10]Note that if age is a (negative) measure of growth opportunities as suggested by Petersen and Rajan (1994) and others, then agency models would imply a positive coefficient on age. In contrast, signaling models would imply that younger firms with more growth options would be more likely to issue debt to signal their quality.

likelihood of issuing debt.[11] We measure earnings volatility by a nine-year rolling average standard deviation of returns on assets, and we expect the coefficient on this variable to be negative, since greater earnings volatility makes the event of financial distress more likely.

We note that even a firm with a high probability of bankruptcy can finance its projects with debt if the costs of bankruptcy for creditors are small. Firms with relatively high levels of tangible assets, or assets that can be liquidated easily, would have relatively low *ex post* costs of bankruptcy and *ex ante* costs of issuing debt (Williamson, 1988; Schleifer and Vishny, 1992).[12] As a result, we would expect firms with high liquidation value to be more likely to issue debt than firms with low liquidation value. This suggests an additional reason to expect negative coefficients on the industry average intangible assets/total assets and R&D expenditures/sales ratios discussed above.

We also include a liquidity measure, the ratio of current assets to total assets. Under both agency cost and costs of financial distress models, we might expect this ratio to have a positive coefficient, since the likelihood of financial distress declines as liquidity increases. Furthermore, since liquidity can also be a measure of "free cash flow," agency models such as Jensen (1986) and Stulz (1990) imply a positive relationship between liquidity and the probability of using debt to finance projects. However, the role of liquidity in asymmetric

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[11]On the other hand, if the current profitability of a firm is an indication of its investment and growth opportunities, then more profitable firms may choose equity over debt financing. For example, Chang (1987) presents a model of security design that is based on agency conflicts that predict a *negative* relationship between profitability and issuing debt.

[12]The liquidation value of a firm is also related to how specific its assets are to that firm or sector. Firms with assets that are highly industry- and firm-specific would use less debt because the liquidation value of these assets is substantially reduced.

information models is potentially complicated. Suppose we believe that firms face severe information problems. Then we would never expect to see firms simultaneously holding stockpiles of liquid assets (high liquidity ratios) and issuing (high-cost) equity. Therefore, if firms with high liquidity ratios obtain external financing, information problems may not be as severe for these firms. As discussed above, fewer information asymmetries would imply a positive (negative) coefficient on liquidity if the quantity rationing (price) effect of adverse selection dominates the price (the quantity rationing) effect.

SBIC characteristics Because SBICs are agents in their transactions with investors who provide funds to them, they face the same sort of agency conflicts with their shareholders and creditors as small firms. Further, because SBICs are eligible for government subsidies by issuing SBA-guaranteed debentures (SBA leverage), and because we believe SBICs' asset choices may not be independent of their liability structure, we need to consider how SBA leverage affects their security choices.[13] Consequently, we include the characteristics of SBICs that are likely to influence their investment policies as independent variables in equation (1).

In particular, we include the size and age of the SBIC, whether it is organized as a corporation or a partnership, and its profitability.[14] We also include a variable that measures

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[13]See Brewer, Genay, Jackson, and Worthington (1996a) for a detailed discussion of the regulations faced by SBICs, such as restrictions on their investments, and the likely effects of those regulations on their financial performance.

[14]The results of previous studies indicate that characteristics of venture capital firms and the agency relationships they face have significant effects on how they structure their contracts with entrepreneurs and investors that provide funds to them (Sahlman, 1990; Barry, 1994; Lerner, 1994; Gompers, 1995a). However, we are aware of little evidence on how the firms' financing policies may be affected by the principal–agent relationship between the

the extent to which an SBIC relies on subsidized SBA funds relative to its own funds, the ratio of SBA funds to private capital. Many SBICs fund their activities by issuing SBA-guaranteed debentures, which are long-term securities. In Brewer, Genay, Jackson, and Worthington (1996a), we have found that that SBA leverage is more burdensome for SBICs oriented toward equity investments, because leveraged SBICs need to generate sufficient cash flows to make payments on their SBA debt.[15] As a result, efficient asset management implies that highly leveraged SBICs should be more likely to make debt investments than are less leveraged SBICs.

We also include in equation (1) an indicator variable denoting bank affiliation. The SBIC program enlarges the investment activities of banking organizations beyond those typically permitted for their commercial bank and venture capital units.[16] Thus, by establishing an SBIC unit, banking organizations reveal their preference for making equity investments. Furthermore, equity investments are likely to complement the loans made by the credit departments of banks, providing opportunities for diversification. In addition, equity investments may enable these firms to spread the costs of monitoring and generating information over several products/services, generate scale economies in monitoring costs, and

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investors and their financiers; consequently, we include most characteristics of SBICs as control variables and do not assign expected signs to their coefficients.

[15]Similarly, the U.S. General Accounting Office (1993) reports that the SBA leverage of SBICs and their portfolio composition had a significant impact on the likelihood that they would be liquidated.

[16]For example, while traditional bank-owned venture capital units can only own up to 5 percent of a small firm's equity, banks' SBIC units can own up to 50 percent of a small firm's equity. For a more detailed discussion of bank- versus nonbank-owned SBICs, see Brewer and Genay (1994) and Brewer, Genay, Jackson, and Worthington (1996a).

allow banking organizations to participate in the profits of companies in which they invest, hence provide compensation for their monitoring activities (Rajan, 1992; Petersen and Rajan, 1994, 1995). Therefore, we expect bank-affiliated SBICs to be more likely to make nondebt investments.

IV. Data

We use data from two files obtained from the SBA -- Reports of Condition of SBICs and investment files. The Reports of Condition provide detailed balance-sheet and income statement information for SBICs over the 1986–91 period.[17] The investment files contain information about every financing transaction conducted by SBICs between 1983 and 1992, and they include descriptive information about the small firms and the transactions themselves.[18] We also augment the SBA data with information from the Compustat database. Specifically, we construct variables that describe the characteristics of the industry (two-digit SIC) in which sample firms operate, covering the 1983–92 period. We restrict the firms sampled from Compustat to those with assets less than $250 million to ensure that we are measuring the characteristics of smaller firms. Restricting the sample to those transactions for which we have nonmissing data on small firm characteristics and SBICs' financial conditions yields two different samples. The first, consisting of 11,870 transactions, contains all SBIC financings between 1983 and 1992 for which we have information on the recipient firms's characteristics and were able to match relevant Compustat data. The second, consisting of

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[17]Specifically, the financial statements pertain to the fiscal years 1987–92.

[18]As noted in Brewer, Genay, Jackson, and Worthington (1996a), SBIC funding reached its local peak in 1988, then declined, reaching a local trough in 1991. Thus, the period we study, 1983–92, covers much of the recent boom and bust cycle experienced by SBICs.

5,881 of the original 11,870 transactions, covers the 1986-1991 period, the years for which we have financial records of the SBICs.

Tables 1 through 3 offer some simple statistics describing our data. Table 1 shows the distribution of SBIC investments over the 1983–92 sample period and the total dollar value of activity in each investment category, adjusted for inflation. Nondebt securities (defined as equity, debt with equity features, and mixed issues) represent a larger fraction of both the number of financings and the dollar volume of activity than debt securities. Among nondebt securities, equity investments account for the largest portion of both transactions and dollar amounts. On average, nondebt financings are larger than debt financings. The average nondebt financing is $269,700, while the average debt financing is $121,600. Among nondebt financings, combinations of equity and debt finance are larger ($573,300) than equity ($274,500) and debt with equity features ($184,300) financings. In the remainder of this paper we analyze the debt/nondebt choice.

Table 2 reports the frequency of debt and nondebt funding, holding constant firm characteristics such as size, age, organizational form, and intended use of funds. In broad terms, the table indicates that debt fundings by SBICs go to smaller, older firms, while nondebt fundings go to larger, younger firms. For example, 47.1% of all SBIC financings to the smallest firms, those with fewer than 50 employees, are in the form of debt, compared with just 17.3 percent of financings to the largest firms (over 500 employees). Similarly, among firms less than one year old, 31.7 percent of SBIC financings are in the form of debt, while among firms over 10 years old, the debt share is 60.2 percent. Corporations are less likely to receive debt fundings than partnerships. Finally, Table 2 also shows that transactions

in which the reported uses of funds included plant modernization, new building or plant, acquisition of machinery, and land acquisition are very likely to be financed with debt, while those linked to the acquisition of an existing business, marketing, or research and development are highly unlikely to be financed with debt.

Table 3 reports the simple means and standard deviations for the explanatory variables we use in our analysis. Many of these variables are indicator variables, for which we report the mean (the frequency) only. The average firm receiving SBIC financing is slightly over 6 years old, somewhat older that those that typically receive venture capital financing (Gompers, 1995b). An overwhelming fraction (93%) of SBIC financings go to firms organized as corporations; partnerships and sole proprietorships represent 3% and 6% of the sample, respectively.

In addition, most SBIC fundings go to smaller firms. The size category that receive most SBIC financings is 20-49 employees and the distribution of SBIC financings is fairly symmetric around this class. Furthermore, financing of firms with less than 8 employees represent over 20 percent of our sample. However, firms receiving SBIC funds appear to be larger than those sampled in the National Survey of Small Business Finances (NSSBF), where firms with less than 10 employees represented over 76% of that sample (Elliehausen and Wolken, 1995 Table 1.1).

Among the intended use of funds, most financings are for operating capital (73%), followed by acquisition of existing businesses (8%) and consolidation of debts (7%). A large fraction of SBIC investments are in the manufacturing sector (48%); however, services and retail sectors also represent significant fractions of the sample (20% and 18%, respectively).

Furthermore, over 60% of fundings are repeat financings of small firms by the same SBICs.

The average industry measures for the firms in our sample indicate that they have highly liquid assets and relatively high market-to-book values. Furthermore, bank-affiliated SBICs provided 19% of the fundings in the sample. On average, SBICs in the sample levered their private capital with SBA funds up to 1.4 times and earned a 9% return on assets.

V. Results

Table 4 contains the results of estimating equation (1) for a sample of 11,870 transactions over the 1983-1992 period. In brief, our estimates offer substantial support for the agency costs view of security issue choice, and some support for asymmetric information models. We turn first to the relationship between the intended use of funds, or project, and the probability of using debt. Our empirical specification includes indicator variables for nine of the ten use categories, with "other" being the excluded category. Table 4 shows that the coefficients on many of the use indicators differ significantly from that on the base category, some with positive and some with negative coefficients. To simplify interpretation, we calculated the implied predicted probability of using debt for each of the ten categories, holding all other variables at their sample means, and we report them in column 1 of Table 5. What is striking about these probabilities is how well they line up with the broad implications of agency theory. Investment projects that are likely to generate tangible assets with some liquidation or collateral value are more likely to be debt financed than are other projects. The four project types with the highest probabilities are land acquisition, new building or plant construction, plant modernization, and acquisition of machinery or equipment, all of which generate significant tangible asset and/or offer liquidation and collateral value to lenders. On

the other hand, projects likely to generate intangible assets, or to involve significant opportunities for managerial discretion and asset substitution, are at the bottom of the list: the acquisition of an existing business, marketing activities, and research and development. We view these results as strong evidence that agency conflicts are an important influence on security issue choice.[19]

The results in table 4 also imply that initial fundings differ significantly from repeat transactions. The predicted probability of using debt is 29.3% for initial fundings and rises sharply to 44.3% for repeat fundings. These probability estimates can be used to predict actual security issue choices: if the probability of using debt exceeds some threshold value, we assign a value of 1 to our dependent variable (choose debt). Using 0.5 as our threshold, we find that, other things equal, moving from a first-time financing to a repeat financing does not alter the security issue chosen: both are nondebt (both have predicted probabilities less than 0.5). But using the actual sample frequency of debt (0.4) as our threshold, we find that that initial fundings are predicted to be nondebt, and repeat fundings are predicted to be debt. This result is consistent with the view that relaxation of asymmetric information problems are likely to result in increased debt issuance if the easing of debt rationing is greater than the reduction in lemons' premium on equity.

We can use the coefficient estimates in table 4 to address the question of whether the

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[19]In earlier work along these lines, Brewer, Genay, Jackson, and Worthington (1996b) grouped the use categories into three supersets: transactions-oriented uses, which included land acquisition, new building or plant construction, plant modernization, acquisition of machinery, and debt consolidation; operating capital; and relationship-oriented uses, which included all of the other uses. This classification followed the suggestion of Nakamura (1993). The predicted probabilities in Table 5 indicate that earlier groupings in Brewer, Genay, Jackson, and Worthington (1996b) were reasonable ones.

impact of establishing an SBIC-small firm relationship varies by the type of investment project. Columns 2 and 3 of Table 5 report the predicted probabilities of using debt, evaluated for all 20 possible pairs of project types and initial or repeat funding. Of course, the repeat probabilities exceed the initial probabilities, reflecting the positive coefficient on the repeat funding variable. Again, we want to distinguish between the effect on the predicted probabilities and the effect on the predicted security issue choice. The probability effect is sizeable for all project types, but the impact on predicted security issue choice is, naturally, largest for those projects that are "near" the threshold between debt and nondebt. That is, projects with high initial probabilities, such as land acquisition, have even higher probabilities in repeat fundings, but the predicted outcome is debt in both cases. Similarly, projects with low initial probabilities, such as research and development expenses, also experience an increase in their probabilities of using debt in repeat fundings, but the probabilities still fall short of 0.5, implying a predicted security issue choice of nondebt. Thus, only those projects in the middle, with initial probabilities "near" the (arbitrary) threshold of 0.5, experience a change in the predicted value of the security issue choice when moving from initial to repeat fundings. Table 5 shows that only acquisition of machinery and debt consolidation projects show a change in predicted security issue choice under this rule.[20] We interpret these results to mean that the impact of initial vs. repeat fundings on security issue choice is felt most when firms are planning projects for which the debt/nondebt decision is not an obvious one.

The performance of our other monitoring and asset substitution variables is somewhat mixed. The coefficient estimates in table 4 imply that the predicted probability of using debt

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[20]A threshold of 0.4 would add the operating capital category to the other two mentioned.

is highest for proprietorships, at 71.9%, and falls to 43.1% and 36.8% for partnerships and corporations, respectively. We interpret these results to support agency theory's prediction that the limited liability feature of corporations exacerbates the debt/equity conflict, hence raises the cost of issuing debt. The estimates in table 4 also imply that being in the same state as the funding SBIC raises a small firm's probability of receiving debt from 33.9% to 43.4%. Increases in the ratio of intangible assets to total assets increase the probability of using debt, countering the predictions of agency theory and previous studies such as Titman and Wessels (1988), Friend and Lang (1988), and Rajan and Zingales (1995). Further, the estimates in table 4 imply that the effect is statistically and economically significant: Raising the intangible/total assets ratio by one standard deviation raises the predicted probability of using debt by between 2.4 and 3.2 percentage points, depending on where the derivative is evaluated. On the other hand, the impact of the R&D variable is as expected: As the ratio rises, the probability of using debt falls, a result similar to that of Titman and Wessels (1988).

Our measure of growth opportunities and the cost of curtailing managerial discretion, the ratio of the market value to book value of assets, performs as expected by agency cost models: An increase of one standard deviation in the market-to-book value ratio decreases the probability of choosing debt by between 2.5 and 3.3 percentage points. This result is in line with previous research by Smith and Watts (1992) and Jung, Kim, and Stulz (1996). As discussed above, this result contradicts predictions arising from signalling models.

Our last group of variables measures firm risk, or the expected costs of financial distress. We first consider the role played by the small firm's own characteristics. The coefficient estimates in table 4 imply that the probability of using debt rises with age at a

decreasing rate: At sample means, increasing firm age by 1 year raises the probability of using debt by 2.0 percentage points. The coefficient estimates in table 4 also imply that the probability of using debt decreases as firm size increases. Table 5 contains the implied predicted probabilities that debt is used for each size class of firm, holding all other variables at their sample means. The smallest firms are predicted to use debt 58.5% of the time, compared to 11.7% of the time for the largest firms.

The result on firm age is consistent with agency theory's view that older firms face lower costs of issuing debt. An alternative interpretation is that older firms have fewer information asymmetries than younger firms, hence are less likely to be rationed in the debt market. On the other hand, the result on firm size is inconsistent with the agency theory view that larger firms face lower costs of issuing debt than smaller firms. Our result also conflicts with those of Smith and Watts (1992) and Jung, Kim, and Stulz (1996), who find that larger firms are more likely to issue debt. However, the result on firm size is consistent with the view that larger firms that face fewer information problems may have lower lemons' premia on equity. We believe our finding may also reflect the fact that these small businesses obtain an unknown amount of debt finance from other, non-SBIC sources that we do not capture in our data.

Other firm risk measures perform as expected: Firms in industries with higher returns on assets are more likely to obtain debt, though the effect is not statistically significant, and firms in industries with higher earnings volatility are less likely to obtain debt. For comparison, we note that Jung, Kim, and Stulz (1996) include stock return volatility in their estimation of the likelihood of issuing equity and find that the coefficient on this variable is

significantly positive in only one of their five specifications.

Finally, we find that increases in liquidity decrease the probability of using debt: Raising the liquidity ratio by one standard deviation lowers the predicted probability of using debt by between 4.8 and 6.4 percentage points. This result is consistent with the view that firms that have financial slack and obtain external funds are less information problematic and have lower lemons' premium on equity.[21]

We now turn to the results from estimating a version of equation (1) using the smaller sample of 5881 transactions over the 1986-1991 time period. This specification includes several variables which describe the financial and legal characteristics of the SBICs doing the funding of these small firms. Coefficient estimates, standard errors, significance levels, and summary statistics are in Table 7. We first note that a likelihood ratio test on the SBIC variables rejects the hypothesis that their coefficients all equal zero. We also note the increase in the explanatory power of the model: Pseudo-R^2 rises to 0.43 in this specification, and the percent correctly classified rises to 76.9%.[22]

The performance of the small firms and project characteristics is little changed by the addition of the variables describing the characteristics of the funding SBICs. The relationship between intended use of funds and security issue choice remains strong in this specification, and again it is the projects associated with investments in tangible assets that are most likely

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[21]By comparison, Jung, Kim, and Stulz (1996) find that liquidity has no significant effect on the security choice decision.

[22]Note that these figures cannot be directly compared to the ones in Table 4, which was based on a larger sample size. Re-estimating the model of Table 4 over the smaller sample (1986-1991) yields a pseudo-R^2 of .38 and a percent correctly classified of 73.0%.

to be debt financed. Similarly, repeat financings remain more likely to be debt financed than initial fundings. Firms in industries with high growth opportunities are again less likely to be debt financed, and older firms are again more likely to use debt than younger firms, though the marginal effect is somewhat smaller in this specification. Similarly, the probability of using debt decreases as firm size increases, and the effects of the other firm risk variables are little changed from the results in Table 4.

Now consider how SBICs' own characteristrics affect security issue choice. We find that high rates of SBA leverage are associated with higher probabilities of doing debt finance, as predicted. In addition, bank-affiliated SBICs are less likely to do debt financings, consistent with our expectations. Older SBICs are more likely to do debt financing than younger ones, though the effect is not statistically significant. The effect of size is also positive: An increase of one standard deviation in SBIC total assets raises the probability of using debt by 36.1 percentage points. SBICs organized as corporations are more likely to do debt fundings than are partnerships and more profitable SBICs are less likely to do debt finance.

We also estimated equation (1) using samples consisting of pure debt and equity financings, eliminating transactions that involve debt with equity or hybrid fundings.[23] The results are very similar to those we present here. For example, moving from an initial funding to a repeat funding raises the predicted probability of debt from 49.2% to 68.0%. Using the new sample's frequency of debt (0.54) as threshold, this again implies that the model's predicted security issue choice for an initial funding is equity, and for a repeat

[23]Complete results for the pure debt/equity choice model are available on request.

transaction, it is debt.

VI. Discussion and conclusion

In this article, we use a unique transactions-level dataset of small business financing to examine how firms and investment companies choose the types of security used to finance firms' investment projects. Our results show that there is a strong, positive association between the incidence of using debt to fund a small business and using the funds to finance a project likely to generate tangible assets and permit little managerial discretion. This result is consistent with the agency (contracting) theory view of the firm. In addition, we find that the likelihood of using debt rises sharply for firms that are receiving a repeat funding from a particular SBIC, and we interpret this as evidence consistent with the asymmetric information view of security issue choice.

More generally, we find solid evidence that factors decreasing monitoring costs or ease of asset substitution are associated with an increased likelihood of using debt finance, consistent with agency cost models of security issue choice. Only one of our measures, the intangible assets to total assets ratio, offers evidence to the contrary. We also find that firms in industries facing high growth opportunities are less likely to use debt finance, a result consistent with previous research and agency models.

Our results on firm size and age offer mixed evidence on the implications of agency and asymmetric information models. We find that younger firms are more likely to obtain nondebt financings. This result is consistent with the view that higher firm risk lowers the probability of using debt and the view that information problematic firms face credit rationing. On the other hand, we also find that smaller firms are more likely to receive debt financing

than larger firms. Although this result conflicts with the predictions of contracting theory, it is consistent with the hypothesis that underpricing of equity for information problematic firms is higher. This result may also be explained partially by the fact that larger firms in our sample may have alternative, non-SBIC sources for credit. The private placement of debt with SBICs by the smallest firms in our sample may indicate that SBICs offer an otherwise unavailable funding opportunity for these firms.

We also find that firms in industries with high liquidity ratios are less likely to use debt. While this result is inconsistent with the implications of agency theory and costs of financial distress, we argue that it is consistent with low information costs. Firms with financial slack would choose to obtain external financing only when information problems are low. If lower information costs imply lower lemons' premium on equity, then we would expect a negative coefficient on the liquidity ratio.

Finally, we find that characteristics of the funding SBIC affect security issue choice. In particular, SBICs using a higher amount of funds and guarantees from the SBA tend to be more likely to do debt than nondebt financing. In addition, SBICs affiliated with banking organizations and those organized as partnerships are more likely to provide nondebt financings. These results suggest that multiple agency relationships of investors may affect how they fund firms.

We plan to extend our work on security issue choice in several ways. For example, for a subset of firms in our sample, we will be able to consider the role of initial vs. repeat fundings by conditioning on the type(s) of funds received at the initial transaction. This may allow us to develop more refined hypotheses on how the severity of debt/equity holder

conflicts and/or owner/manager conflicts may change over the course of a funding relationship. We can also consider the financing policy of small firms in conjunction with their other policies. For instance, in this paper we find that project choice is significantly correlated with financing choice. However, since a firm's project choice is likely to be made simultaneously with the financing arrangements, both project choice and security issue choice are likely to be endogenous. Developing and testing a structural model along these lines remains another topic for future research.

References

Akerlof, George A., 1970, The market for "lemons": Quality uncertainty and the market mechanism, *Quarterly Journal of Economics* 84, 488-500.

Barclay, Michael J. and Clifford W. Smith, Jr., 1995a, The maturity structure of corporate debt, *Journal of Finance* 50 (2), 609–631.

Barclay, Michael J. and Clifford W. Smith, Jr., 1995b, The priority structure of corporate liabilities, *Journal of Finance* 50 (3), 899–917.

Barry, Christopher B., 1994, New directions in research on venture capital finance, *Financial Management* 23 (3), 3–15.

Berger, Allen N. and Gregory F. Udell, 1995, Relationship lending and lines of credit in small firm finance, *Journal of Business* 68 (3), 351–81.

Brennan, Michael J. and Alan Kraus, 1987, Efficient financing under asymmetric information, *Journal of Finance* 42 (5), 1225-1243.

Brewer III, Elijah and Hesna Genay, 1994, Funding small businesses through the SBIC program, Federal Reserve Bank of Chicago *Economic Perspectives* 18 (3), 22–34.

Brewer III, Elijah, Hesna Genay, William E. Jackson III, and Paula R. Worthington, 1996a, Performance and access to government guarantees: The case of small business investment companies, Federal Reserve Bank of Chicago *Economic Perspectives* 20 (5), 16–32.

Brewer III, Elijah, Hesna Genay, William E. Jackson III, and Paula R. Worthington, 1996b, How are small firms financed? Evidence from small business investment companies, Federal Reserve Bank of Chicago *Economic Perspectives* 20 (6), 2–18.

Calomiris, Charles W. and R. Glenn Hubbard, 1990, Firm heterogeneity, internal finance, and 'credit rationing', *Economic Journal* 100 (399), 90-104.

Chang, Chun, 1987, Capital structure as optimal contracts, Working paper, University of Minnesota, Carlson School of Management.

DeAngelo, Harry and Ronald W. Masulis, 1980, Optimal capital structure under corporate and personal taxation, *Journal of Financial Economics* 8 (1), 2-29.

Diamond, Douglas, 1991, Monitoring and reputation: The choice between bank loans and directly placed debt, *Journal of Political Economy* 99 (4), 688–721.

Elliehausen, Gregory E. and John D. Wolken, 1995. *Descriptive Statistics from the 1987 National Survey of Small Business Finances* (Board of Governors of the Federal Reserve System, Washington, D.C.).

Fazzari, Steven M., Robert Glenn Hubbard, and Bruce C. Petersen, 1988, Financing constraints and corporate investment, *Brookings Papers on Economic Activity* 0 (1), 141-195.

Friend, Irwin and Larry H. P. Lang, 1988, An empirical test of the impact of managerial self-interest on corporate capital structure, *Journal of Finance* 43 (2), 271-281.

Gompers, Paul A, 1995a, Grandstanding in the venture capital industry, Working paper, University of Chicago.

Gompers, Paul A., 1995b, Optimal investment, monitoring, and the staging of venture capital, *Journal of Finance* 50 (5), 1461–89.

Harris, Milton and Artur Raviv, 1990, Capital structure and the informational role of debt, *Journal of Finance* 45 (2), 321–349.

Harris, Milton and Artur Raviv, 1992, Financial contracting theory, in Jean Jacques Laffont, ed.: *Advances in Economic Theory: Sixth World Congress, volume 2* (Cambridge University Press, Cambridge).

Heinkel, Robert, 1982, A theory of capital structure relevance under imperfect information, *Journal of Finance* 37 (5), 1141-50.

Jensen, Michael C., 1986, Agency costs of free cash flow, corporate finance, and takeovers, *American Economic Review* 76, 323–29.

Jensen, Michael C. and William H. Meckling, 1976, Theory of the firm: Managerial behavior, agency costs, and ownership structure, *Journal of Financial Economics* 3, 305–360.

Jung, Kooyul, Yong-Cheol Kim, and Rene M. Stulz, 1996, Timing, investment opportunities, managerial discretion, and the security issue decision, *Journal of Financial Economics* 42, 159-185.

Lerner, Joshua, 1994, Venture capitalists and the decision to go public, *Journal of Financial Economics* 35 (3), 301–318.

Lerner, Josh, 1995, Venture capitalists and the oversight of private firms, *Journal of Finance* 50 (1), 301–318.

MacKie-Mason, Jeffrey K., 1990, Do firms care who provides their financing?, in R. Glenn Hubbard, ed.: *Asymmetric Information, Corporate Finance, and Investment* (The University of Chicago Press, London and Chicago, IL).

Maddala, G. .S., 1983. *Limited Dependent and Qualitative Variables in Econometric* (Cambridge University Press, Cambridge, Sydney, and New York, N.Y.).

Modigliani, Franco and Merton H. Miller, 1958, The cost of capital, corporation finance, and the theory of investment, *American Economic Review* 48, 261–297.

Myers, Stewart, 1977, Determinants of corporate borrowing, *Journal of Financial Economics* 5 (2), 147-175.

Myers, Stewart C., 1984, The capital structure puzzle, *Journal of Finance* 39, 575-592.

Myers, Stewart C. and Nicholas S. Majluf, 1984, Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics* 13, 187-221.

Nakamura, Leonard, 1993, Recent research in commercial banking: Information and lending, *Financial Markets, Institutions, and Instruments* 2 (5), 73–88.

Noe, Thomas, 1988, Capital structure and signalling game equilibria, *Review of Financial Studies* 1, 331-356.

Petersen, Mitchell A. and Raghuram G. Rajan, 1994, The benefits of firm–creditor relationships: Evidence from small business data, *Journal of Finance* 49 (1), 3–37.

Petersen, Mitchell A. and Raghuram G. Rajan, 1995, The effect of credit market competition on lending relationships, *Quarterly Journal of Economics*, 110 (2), 407-443.

Rajan, Raghuram G., 1992, Insiders and outsiders: The choice between informed and arm's-length debt, *Journal of Finance* 47 (4), 1367–1400.

Rajan, Raghuram G. and Luigi Zingales, 1995, What do we know about capital structure? Some evidence from international data, *Journal of Finance* 50 (5), 1421-1460.

Ross, Stephen A., 1977, The determination of financial structure: The incentive-signalling approach, *Bell Journal of Economics* 8, 23-40.

Sahlman, William A., 1990, The structure and governance of venture-capital organizations, *Journal of Financial Economics* 27 (2), 473–521.

Schleifer, Andrei and Robert W. Vishny, 1992, Liquidation values and debt capacity: A market equilibrium approach, *Journal of Finance* 47 (4), 1343–1366.

Smith, Clifford W., Jr. and Ross L. Watts, 1992, The investment opportunity set and corporate financing, dividend, and compensation policies, *Journal of Financial Economics* 32 (3), 263-292.

Stiglitz, Joseph E. and Andrew Weiss, 1981, Credit rationing in markets with imperfect information, *American Economic Review* 71, 393-410.

Stulz, René M., 1990, Managerial discretion and optimal financing policies, *Journal of Financial Economics* 26 (1), 3–28.

Titman, Sheridan and Roberto Wessels, 1988, The determinants of capital structure choice, *Journal of Finance* 43 (1), 1-20.

U.S. General Accounting Office, 1993, Report to the Chairman, Committee on Small Business, U.S. Senate, GAO/RCED-93–51, *Financial Health of Small Business Investment Companies* (General Accounting Office, Washington, D.C.).

Williamson, Oliver, 1988, Corporate finance and corporate governance, *Journal of Finance* 43, 567–591.

Table 1 Summary statistics on SBIC financings, 1983-1992

	# of financings	share of financings (%)	$ value ($82-84 mil)	mean size ($82-84 thous)
debt	4784	40.3	581.5	121.6
nondebt	7086	59.7	1910.9	269.7
equity	4047	34.1	1111.1	274.5
debt with equity features	2423	20.4	446.7	184.3
equity & debt with equity features	616	5.2	353.2	573.3
total	11,870	100.0	2492.5	210.0

Note: sample consists of 11,870 transactions over the 1983-1992 period for which complete data are available. All dollar figures are deflated by the CPI-U.

Table 2 Shares of debt and nondebt transactions, by small firm and project characteristics, 1983-1992
percent

Panel A: Number of employees	debt	nondebt
1-49	47.1	52.9
50-249	28.0	72.0
250-499	14.1	85.9
500 and over	17.3	82.7

Panel B: Legal form of small business	debt	nondebt
corporation	37.6	62.4
partnership	55.3	44.7
sole proprietorship	87.9	12.1

Panel C: Age of small business	debt	nondebt
< 1 year	31.7	68.3
1 to 5 years	34.7	65.3
5 to 10 years	41.3	58.7
over 10 years	60.2	39.8

Panel D: Intended use of funds	debt	nondebt
operating capital	39.3	60.7
plant modernization	83.8	16.2
acquisition of existing business	24.6	75.4
consolidation of debts	55.2	44.8
new building or plant construction	77.3	22.7
acquisition of machinery/equipment	59.5	40.5
land acquisition	89.7	10.3
marketing activities	9.1	90.9
research and development	6.5	93.5
other	39.1	60.9

Note: sample consists of 11,870 transactions over the 1983-1992 period for which complete data are available. Nondebt financings include equity, debt with equity features, and combinations of equity and debt with equity features.

Table 3 Summary statistics on small firms and SBICs, 1983-1992

Variable	Number Of Observations	Mean	Standard Deviation
Age of small business, years	11870	6.22	9.09
Number of Employees: 1-3*	11870	0.11	
Number of Employees: 4-7*	11870	0.12	
Number of Employees: 8-19*	11870	0.21	
Number of Employees: 20-49*	11870	0.23	
Number of Employees: 50-99*	11870	0.16	
Number of Employees: 100-249*	11870	0.12	
Number of Employees: 250-499*	11870	0.03	
Corporation*	11870	0.93	
Partnership*	11870	0.03	
SBIC and firm in same state*	11870	0.49	
Use: operating capital*	11870	0.73	
Use: plant modernization*	11870	0.01	
Use: acquisition of existing business*	11870	0.08	
Use: consolidation of debts*	11870	0.07	
Use: new building or plant construction*	11870	0.01	
Use: acquisition of machinery/equiptment*	11870	0.04	
Use: land acquisition*	11870	0.01	
Use: marketing activities*	11870	0.01	
Use: research and development*	11870	0.03	
Manufacturing sector*	11870	0.48	
Transportation and communications*	11870	0.06	
Retail*	11870	0.18	
Services*	11870	0.20	
Repeat SBIC/small business pair*	11870	0.63	
Industry current assets/total assets ratio	11870	0.60	0.14
Industry market value-to-book value of assets	11870	2.14	0.85
Industry research & development expenses/sales	11870	0.62	2.92
Industry return on assets (%)	11870	-3.73	8.48
Industry standard deviation of return on assets (%)	11870	4.88	3.06
Industry intangible assets/total assets ratio	11870	0.04	0.04
SBIC age	11870	6.53	9.76
SBIC total assets in millions	5881	38.24	72.32
SBIC form: corporation*	5881	0.75	
Ratio of SBA leverage to SBIC's private capital	5881	1.41	1.23
SBIC's return on assets	5881	0.09	0.21
SBIC: bank-owned*	11870	0.19	

*Reported mean is the frequency in the data.

Note: statistics are computed over the largest sample available for each variable. The 11,870 observation sample represents all transactions over the years 1983-1992 for which complete data are available; the 5881 observation sample includes transactions only from 1986-1991.

Table 4 Determinants of the Probability(debt), based on debt/nondebt choice, 1983-1992

Variable	Parameter Estimate	Standard Error	Pr > Chi-Square
Intercept	-0.8370	0.4720	0.0762
Age of small business, years	0.0965	0.00553	0.0001
Firm age squared /100	-0.1042	0.00967	0.0001
Number of Employees: 1-3	2.3606	0.2383	0.0001
Number of Employees: 4-7	2.0510	0.2355	0.0001
Number of Employees: 8-19	1.9263	0.2317	0.0001
Number of Employees: 20-49	1.4124	0.2315	0.0001
Number of Employees: 50-99	1.1656	0.2339	0.0001
Number of Employees: 100-249	1.0208	0.2359	0.0001
Number of Employees: 250-499	0.1428	0.2760	0.6050
Small business form: corporation	-1.4779	0.1504	0.0001
Small business form: partnership	-1.2142	0.1939	0.0001
SBIC and firm are in same state	0.4009	0.0444	0.0001
Use: operating capital	0.2979	0.3428	0.3848
Use: plant modernization	1.4981	0.4134	0.0003
Use: acquisition of existing business	-0.5045	0.3523	0.1521
Use: consolidation of debts	0.6485	0.3510	0.0647
Use: new building or plant construction	1.8146	0.4341	0.0001
Use: acquisition of machinery/equipment	0.8910	0.3601	0.0133
Use: land acquisition	2.3734	0.4602	0.0001
Use: marketing activities	-1.1731	0.4738	0.0133
Use: research and development	1.3637	0.4130	0.0010
Repeat SBIC/small business pair	0.6520	0.0501	0.0001
Industry current assets/total assets ratio	-1.9142	0.2101	0.0001
Industry market-to-book ratio	-0.1658	0.0357	0.0001
Industry research & development expenses/sales	-0.0138	0.00938	0.1409
Industry return on assets	0.00270	0.00372	0.4677
Industry standard deviation of return on assets	-0.0568	0.00942	0.0001
Industry intangible assets/total assets ratio	3.4895	0.8628	0.0001
Log likelihood	-6344.16		
Chi-square statistic	3317.72		
% correctly classified	72.7		
pseudo-R^2	0.33		

Sample size is 11,870, and year and sector dummies are included but not reported. Chi-square statistic is computed as -2 $\log_e(L_\omega - L_\Omega)$, where L_Ω is the maximized likelihood and L_ω is the likelihood under the null that all coefficients equal zero. Pseudo-R^2 is computed as suggested by Maddala (1983), pp. 37-41.

Table 5 The impact of intended use of funds on the predicted probability of using debt

Intended use of funds	All transactions	Initial	Repeat
Land acquistion	.837	.772	.867
New building or plant construction	.745	.660	.788
Plant modernization	.681	.586	.731
Acquisition of machinery/equipment	.538	.435	.596
Debt consolidation	.477	.377	.537
Operating capital	.391	.298	.449
Other	.323	.240	.377
Acquisition of existing business	.224	.160	.268
Marketing activities	.129	.089	.158
Research and development	.109	.075	.134

Note: predicted probabilities are computed using coefficient estimates from Table 4 and holding all other variables at their means.

Table 6 The impact of firm size on the predicted probability of using debt

Number of employees	Predicted probability
1-3	.585
4-7	.508
8-19	.477
20-49	.353
50-99	.299
100-249	.269
250-499	.103
>= 500	.117

Note: predicted probabilities are computed using coefficient estimates from Table 4 and holding all other variables at their means.

Table 7 Determinants of the Probability(debt), based on debt/nondebt choice, 1986-1991

Variable	Parameter Estimate	Standard Error	Pr > Chi-Square
Intercept	-2.9531	0.9871	0.0028
Age of small business, years	0.0800	0.00804	0.0001
Firm age squared /100	-0.0736	0.0133	0.0001
Number of Employees: 1-3	2.3769	0.3308	0.0001
Number of Employees: 4-7	2.1692	0.3281	0.0001
Number of Employees: 8-19	1.9493	0.3199	0.0001
Number of Employees: 20-49	1.4924	0.3181	0.0001
Number of Employees: 50-99	1.2054	0.3211	0.0002
Number of Employees: 100-249	1.0753	0.3242	0.0009
Number of Employees: 250-499	0.4162	0.3645	0.2535
Small business form: corporation	-2.8471	0.4487	0.0001
Small business form: partnership	2.6652	0.4844	0.0001
SBIC and firm are in same state	0.5406	0.0674	0.0001
Use: operating capital	0.4611	0.5971	0.4400
Use: plant modernization	1.4013	0.6881	0.0417
Use: acquisition of existing busines	-0.3134	0.6063	0.6052
Use: consolidation of debts	0.7158	0.6094	0.2402
Use: new building or plant construction	1.5963	0.7442	0.0320
Use: acquisition of machinery/equipment	0.4710	0.6209	0.4481
Use: land acquisition	2.0070	0.7293	0.0059
Use: marketing activities	-1.4998	0.7979	0.0602
Use: research and development	-2.2104	0.7873	0.0050
Repeat SBIC/small business pair	0.5272	0.0771	0.0001
Industry current assets/total assets ratio	-2.2950	0.3212	0.0001
Industry market-to-book ratio	-0.0987	0.0459	0.0315
Industry research & development expenses/sales	-0.0249	0.0145	0.0859
Industry return on assets	-0.00351	0.00635	0.5806
Industry standard deviation of return on assets	-0.0360	0.0143	0.0117
Industry intangible assets/total assets ratio	3.4254	1.1775	0.0036
SBIC age	0.0239	0.0170	0.1589
SBIC age squared/100	-0.0486	0.0529	0.3584
Log of SBIC total assets	0.2194	0.0330	0.0001
SBIC form: corporation	0.2406	0.0796	0.0025
Ratio of SBA leverage to SBIC's private capital	0.3454	0.0387	0.0001
SBIC's return on assets	-1.1943	0.1815	0.0001
SBIC: bank-owned	-0.4201	0.0975	0.0001
Log likelihood	-2882.83		
Chi-square statistic	2305.29		
% correctly classified	76.9		
pseudo-R^2	0.43		

Sample size is 5881, and year and sector dummies are included but not reported. Chi-square statistic is computed as -2 $\log_e(L_\omega - L_\Omega)$, where L_Ω is the maximized likelihood and L_ω is the likelihood under the null that all coefficients equal zero. Pseudo-R^2 is computed as suggested by Maddala (1983), pp. 37-41.