Does Security Choice Matter in Venture Capital? The Case of Venture Debt

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Abstract

This paper explores the relationship between debt in the entrepreneurial capital structure and outcomes. In contrast to public firms where debt is considered a positive signal, venture capital (VC) debt predicts poorer future firm performance across several dimensions. VC-backed firms that issue debt or debt-like instruments, even after paying back debt in the successive period, have a 25% lower probability of success (IPO/acquisition). Fixed effects estimates show that entrepreneurial firm valuation also falls an average of 20% after debt financing. VCs with equity stakes lend in about about 45% of venture debt financings. We present a model where the insider VC's decision to provide debt to the entrepreneurial firm has informational content. When inside VCs with equity stakes provide debt financing, valuation declines 50% more compared to outside debt financed firms. The estimates and model highlight venture debt's role in alleviating equity price frictions in staged financing.

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Venture capitalists and entrepreneurs choose debt finance for 15% of investments. It is not surprising then, that most studies of venture capital returns or outcomes focus on equity events. We study the debt choices in venture capital financings from 1992 - 2011 and find they predict a 33% lower equity value and 25% lower success probability. Further, the lender's position as an insider predicts differences in these correlations. These facts are puzzling, since according to received theory, external investors – less informed than insiders – interpret debt financing as a positive signal of investment opportunities, and in cross-section value of firms rises with leverage.[1] Moreover, one justification for venture capital as a financial intermediary is high-growth entrepreneurial firms' inability to access bank debt due to a lack of collateral and high information asymmetry. Presumably, entrepreneurial firms that raise debt suffer from fewer such problems. This paper documents debt in venture capital and provides evidence for debt's role in alleviating negotiation or equity pricing frictions.

We ask three questions in this work. First, what is the informational content of the choice of debt for entrepreneurial firms? Second, how can we explain the negative relationship between debt finance and post-debt equity valuations? In particular, we present a financing environment that can justify a venture capitalist's decision to loan capital in the face of certain negative shocks. Finally, what is the connection between the source of debt – inside versus outside investors – and outcomes? The seminal work on capital structure focuses on insiders seeking capital from external investors, whereas inside investors can provide debt in the venture capital setting.

For the over 2,000 firms that raised debt finance, we construct a time series of capital structure and equity valuations using the venture capital database VentureSource. The fixed effect estimates show that entrepreneurial firm value falls an average of 33% after a debt round. Firms with profits exhibit an insignificant fall in valuation after debt financing. Thus, the information content of debt financing is less for firms that have additional mechanisms to convey future success potential such as positive revenues and profitability. The results are robust to sev-

[1] Seminal works include Ross (1977), Leland and Pyle (1977) and Myers and Majluf (1984).

eral valuation measures, selection corrections, the exclusion of failed firms and fixed effects for firm and VC. The presence of debt itself, through a mechanism such as increased probability of bankruptcy, does not cause the fall in future valuation since debt is typically paid back by the successive equity financing. The evidence suggests that debt finance is a response to some unobserved change at the entrepreneurial firm that lowers firm value, rather than the cause.

The cross-section of entrepreneurial firms also reveals relationships between debt financing and outcomes. Some 11% of the 22,179 entrepreneurial firms in the VentureSource data from 1992 to early 2011 obtained debt financing in their lifecycle, which accounts for 4% of all capital invested. Such firms have a 30% lower probability of an IPO or acquisition (which is the industry's convention of measuring success) compared to the mean likelihood of 48%. Debt also predicts lower total value created at exit relative to total invested and a 12% higher probability of CEO change. These relationships are not driven by defaults nor the fact that many firms that borrowed capital did so in the recent past. The differences in outcomes by debt issuance coupled with those from the panel estimates show that the unobserved change in firm quality is persistent over a VC-backed firm's life.

VC equity financings have contract features that behave like debt, such as liquidation preference and equity seniority. Data from ThomsonOne covering 2005 - 2010 provides information on the seniority and payoff structure of over 2,500 venture capital contracts. The major feature of interest is liquidation preference multiple: the downside protection embedded in equity contracts. Coupled with equity seniority, a multiple greater than 1 ensures the investor will at least recoup their initial investment in the face of low liquidation values. Current or past financings with large liquidation preference clauses predict a 26% higher odds of lower of unchanged future valuations, even after controlling for firm effects. These results suggest that a VC investor's shift to debt-like contract features signals negative revisions to firm quality.

Why does an entrepreneurial firm and venture capitalist's choice of debt financing lead to lower than average future prospects? We attempt to reconcile this puzzle with a simple two-period model where an entrepreneur with an idea approaches a VC with a request for capital

to continue the project. As an equity holder in the entrepreneurial firm, the VC shares private information regarding the firm's quality and hence is an "inside" investor. The two parties negotiate the payoff contract for the capital infusion on date 0 and 1. If the firm receives capital on both dates, then on date 2 the surviving firms are put up for sale to external investors. The position as an inside investor and the negotiation between manager and financier are the crucial departures from the capital structure literature (see Myers and Majluf (1984)). Debt enters as a financing alternative after the introduction of a shock to firm quality in the interim period.

The characteristics of the shock to quality and the VC's equity stake play an important modeling role. We show that when the quality shock shifts probability from extreme success to the mediocre outcome, debt becomes a potential financing alternative. In practice, the majority of debt finance in venture capital occurs after the firm's first equity event so the model assumes the VC owns equity in the entrepreneurial firm. The possibility of growth in value of the VC's equity stake provides an incentive to the VC to finance the firm further. As long as the cost of acquiring the option is less than the expected gains from keeping the option, a VC may finance the firm with debt after a negative shock to firm prospects. In this framework, debt is a response to a fall in equity values, which we expect to observe in future equity financings. The results from the cross-section and panel are consistent with the model. The model also provides additional implications that we test: debt from insiders (versus outsiders) leads to lower future equity values and the insiders with larger equity stakes are more likely to lend to the firm.

Debt in venture capital can come from two sources. An inside or external investor can lend money to the entrepreneurial firm. The latter is a debt financing where at least one of the investors does not have an existing equity stake in the entrepreneurial firm.[2] We repeat the panel and cross-section regressions and compare outcomes by the source of debt finance. Debt lent by inside investors predicts 50% more post-debt falls in valuation and 24% lower success probabilities. Controlling for investor size and experience, the syndicate member with the largest equity stake is most likely to lend money to the firm and does so at a higher propensity than

[2]Defining external debt as that lent by all new investors provides similar results.

for equity events. Such investors have a higher values of any growth option on equity. VentureSource also includes a unique database of firms that sought to raise equity finance. The data shows that firms that failed to raise such capital disproportionately switched to debt or bridge loans. Finally, compared to similar equity rounds, debt rounds are smaller and are followed more quickly by new financing events. These additional empirical regularities provide evidence for debt as a growth option on the existing equity stakes.

This paper contributes to the theoretical and empirical work on venture capital contracts. Schmidt (2003) and Hellmann (2006) provide explanations for the use of convertible securities in venture capital. Each build a model with double moral hazard, where both the entrepreneur and the venture capitalist provide value-adding effort. The optimal contract in Hellmann (2006) gives the venture capitalist more cash flow rights in acquisitions than IPOs. Our paper does not address the moral hazard issue with respect to VCs, but rather focuses on the signal provided by the choice of contracts. Cornelli and Yosha (2003) derive the optimal security in a staged financing environment and show that convertible debt contracts can alleviate entrepreneur window-dressing. Bengtsson and Sensoy (2011) analyze the evolution of venture capital equity contracts and find evidence supporting existing theories that financing frictions worsen with poor performance. Our analysis with similar data highlights that debt features of equity behave much like straight debt. Hellmann, Lindsey, and Puri (2008) also study debt from outsiders, but focus on how these capital providers' build lending relationships with entrepreneurial firms. Finally, Cumming (2005) studies the capital structure decisions of venture capitalists and entrepreneurs with a focus on the type of contracts used in equity finance. The economic model we propose differs from each of these approaches through the proposed inside information channel driving security choice.

Compared to traditional theories of financing (see Ross (1977) and Myers and Majluf (1984)), where issuance of debt by a firm is considered a signal of better future prospects, we show that debt financing by inside investors signals worse future prospects. VCs possess in-depth knowledge of firm operations and industry expertise (See Lerner (1995) and Hellmann and Puri

(2002)), and hence cannot be considered uninformed external investors. This paper also adds to the literature on venture capital financing and signaling through capital structure decisions. Green (1984) analyzes the use of conversion features and warrants to control distortionary incentives in a general framework. As most VC equity contracts provide similar downside protections as debt, we believe that incentives are likely a second-order driver of debt in this setting. Gompers (1999) and Kaplan and Stromberg (2003) compare the characteristics of real-world financial contracts to their counterparts in financial contracting theory. The distinguishing characteristic of VC financings is that they allow VCs to separately allocate cash flow rights, board rights, voting rights, liquidation rights, and other control rights. They find that the allocations of cash flow and control rights and the use of contingencies are related in systematic ways and call for additional theory. Our paper postulates that the state contingent contracts between inside investors and entrepreneurs contains information about revision of probabilities of respective states.

We believe this paper makes several contributions in addition to those discussed above. First, to our knowledge it is one of the first systematic analysis of debt in venture capital finance using a large panel of entrepreneurial capital structure dynamics. Second, we find a robust relationship between debt and future equity valuations that suggests a new role for debt as a signal for firm quality and VC expectations. The model highlights a distinguishing feature of debt versus equity in venture capital: difficulty in pricing equity for entrepreneurial firms. In case of a negative shock to firm quality, insider VCs may lend even at a negative expected return on debt, so that the entrepreneurial firm has capital to survive. This allows the parties time to resolve the frictions that made equity pricing infeasible. Our explanation allows for a large set of frictions that could lead to the infeasibility of equity pricing, but does not rely on the typical control and cash flow rights of debt-like components in equity contracts. Finally, the model provides testable implications about the source of the venture debt. Debt lent by inside investors precedes relatively larger falls in equity values and slightly lower success probabilities. Further, those investors who have the highest implied value of the growth option are more likely

to lend to the firm. We argue these differences show the growth option role of venture debt.

The paper proceeds as follows. Section 1 presents a simple two-period model to gain some intuition of the results. Section 2 describes the data used in this work. Section 3 provides supporting empirical evidence. Section 4 concludes.

1 A Simple Model

We follow the setup of Hellmann (2006) to provide the intuition about why debt is a response to negative shocks to venture capital backed firms. Hellmann (2006) shows the importance of convertible bonds if the financing required by the firm from the venture capitalist is high.

We on the other hand, use the setup to answer the question, under what circumstances does straight debt have a role in financing of venture backed firms? We argue that debt has a role in a dynamic financing setup where the quality of the firm is subject to revision at date 1 due to new information obtained since date 0.

1.1 Setup

Assume a risk-neutral world with no discounting. An entrepreneur E has a project idea and wealth w. The required investment in the project is k. Hence, E seeks funding from a set of perfectly competitively venture capitalists, denoted by V.

This is a two-period setup. At date 0, the entrepreneur and the venture capitalist write an optimal contract. With probability $\omega(\leq 1)$ the firm remains a viable enterprize on date 2, and with remaining probability the firm fails with zero payoff for invested equity. At date 0, the two parties assess the quality of the firm regarding whether the firm will achieve high success with probability ω_H or low success with probability ω_L, where $\omega_H+\omega_L = \omega \leq 1$. The total value of the firm in case of high success is v_H and in case of low success is v_L, where $v_H \geq v_L$. On date 1, the parties may obtain additional information ϵ about external risks to the firm's success (Kaplan and Strömberg (2004)), and update the probability of high success to $\omega_H + \epsilon$, and that of low

success to $\omega_L - \epsilon$. Based on new information, the financing contract can be renegotiated at date 1. Cost of effort of entrepreneur and information regarding probability and payoff is verifiable and revealed to both parties at date 0 and 1. On date 2, the project's outcome is realized.

1.2 Contracts

At date 0, the entrepreneur and the venture capitalist enter into an optimal contract, where the venture capitalist makes zero profits due to perfect competition in the venture capital market. The contract specifies cash flow and control rights. The contract can be renegotiated at date 1, subject to additional information ϵ and zero profit condition of the venture capitalist. Two securities, debt and equity will be used in the analysis. In case of success of the project, a debt contract will pay the venture capitalist $(1+r)d$, where r is the interest rate and d is the face value of debt. In case of failure, we assume for simplicity that all capital lent is lost. An equity contract allows the venture capitalist a payoff of $e\,v_H$ in case of high success and $e\,v_L$ in case of low success where e is the venture capitalist's percentage equity stake.

1.3 Incentives

Recent venture capital literature shows that venture capitalists provide value-adding support (Hellmann and Puri (2000), Hellmann and Puri (2002)). Hellmann (2006) models the value-adding process as a double moral hazard, where both the entrepreneur and the venture capitalist provide effort (Inderst and Müller (2004)); and shows that for an independent firm the optimal security is pure equity. Following Hellmann (2006), the base line optimal contract in our case is an equity stake e^* for the venture capitalist. A lower stake of equity for the entrepreneur leads to lower effort by the entrepreneur that reduces firm value. This is due to costly private effort.

1.4 Optimal Cash Flow Rights

Let us first consider a pure equity contract with $e = e^*$. At date 0, the payoffs of the venture capitalist and the entrepreneur are given by:

$$V_E = \omega_H(1-e^*)v_H + \omega_L(1-e^*)v_L - W \text{ and } V_V = \omega_H e^* v_H + \omega_L e^* v_L - X, \tag{1}$$

where W and X denote the investment made by the entrepreneur and the venture capitalist respectively in the firm. For $X > x$, the entrepreneur does not invest all her wealth in the firm, i.e. $W = w - (X - x)$. Perfect competition among venture capitalists requires $U_V = 0$, which yields investment by venture capitalist in the firm to be:

$$X = \omega_H e^* v_H + \omega_L e^* v_L \equiv x_1. \tag{2}$$

At date 1, suppose the parties reassess the firm's ability to have high success to be $\omega_H + \epsilon$, where $\epsilon > 0$. In such a case, the venture capitalist can break even with a smaller $e^* - \delta$ share in the firm where $\delta > 0$ in the firm while financing the firm with the necessary investment x_1. Thus, given an upward adjustment of high success, the break even condition for the venture capitalist is:

$$V_V = (\omega_H + \epsilon)(e^* - \delta)v_H + (\omega_L - \epsilon)(e^* - \delta)v_L - x_1 = 0 \tag{3}$$

Using equations 2 and 3, we get the new equity stake of the venture capitalist $e^* - \delta$ to finance the firm, where δ is given by:

$$\delta = \frac{\epsilon}{\epsilon + \frac{\omega_H v_H + \omega_L v_L}{v_H + v_L}} e^* \tag{4}$$

On the other hand, suppose at date 1, the parties reassess the firm's ability to have high success to be $\omega_H - \epsilon$, where $\epsilon > 0$. The venture capitalist is now unable to break even with the equity contract established at date 0. As in Hellmann (2006), it would also be inefficient to increase the venture capitalists' equity stake above e^*, since that would reduce the incentives of the entrepreneur leading to lower effort by the entrepreneur. In this case, debt allows a third alternative. It allows the venture capitalist to finance the firm with the capital necessary without undermining the incentives of the entrepreneur in the firm. The venture capitalist provides d

in debt with interest rate r, and the remaining $x_1 - d$ in equity. If the venture capitalist receives l in case of failure of the project for debt d, then the expected return including debt is given by:

$$V_V = \underbrace{(\omega_H - \epsilon)e^* v_H + (\omega_L + \epsilon)e^* v_L - (x_1 - d)}_{\text{Return from Equity}} + \underbrace{\omega(1+r)d + (1-\omega)l - d}_{\text{Return from Debt}}, \tag{5}$$

Due to perfect competition $U_V = 0$. Using equations 2 and 5, we get a relation between the downward adjustment of high success ϵ and debt d:

$$\epsilon = \frac{\omega(1+r)d + (1-\omega)l}{e^*(u_H - u_L)} \tag{6}$$

The negative shock has a positive relationship with debt and liquidation value in case of failure of the project. Notice that even in the case of a negative expected return on debt ($r < 0$), the VC may lend on date 1 to continue the firm for one more period rather than liquidate the firm, if the VC believes that the total payoff that includes equity stake may be positive on date 2.

Venture capitalists who already have an equity stake in the firm, finance a firm through debt in response to a negative shock ϵ. Debt here is not the cause of future equity values, but rather an endogenous response to a negative shock. The action of lending capital signals relatively lower quality of the firm to outside investors.

1.5 External VC

In practice new venture capitalist lenders also provide debt at date 1 in certain cases. Since such venture capitalists do not have prior equity stake in the firm, the only reason such an external VC lender will provide debt financing based on the model is if the new venture capitalist can at least break even on debt itself. This provides a lower bound on the quality of success ω of the project for external investors:

$$\omega \geq \frac{1}{1+r}, \tag{7}$$

under the simplifying assumption that all capital is lost in case of failure.

The new venture capitalists have chosen to finance the firm through debt which means equity financing was not provided by internal venture capitalists. At the same time, the fact that

the firm has no equity stake from the new venture capitalists means that the quality assessed ω has a higher lower bound. This conveys a less negative signal about firm quality to outside investors than if the internal venture capitalists had chosen debt financing.

2 Data and Testable Implications

2.1 Data

VentureSource

The main data source is VentureSource, a comprehensive database of venture capital transactions that covers 1990 to March 2011. VentureSource collects their data on venture-capital backed companies with surveys of venture capitalists and entrepreneurial firms. The dataset does not include financings where corporations or institutions are the only investors in a particular company. VentureSource claims near perfect coverage of 1992 to the present for all entrepreneurial firms that received capital from a venture capitalist. Authors such as Cochrane (2005) and Hall and Woodward (2010) use a variant of VentureSource to study venture capital and entrepreneurial returns. We exploit the financing-level information on entrepreneurial firms that include equity, debt and exit (i.e. acquisitions and initial public offerings) events.

Data Characteristics

The major variables of interest in VentureSource are type of financing (equity, debt or exit), financing date, amount invested and valuation. Although recognized as a major source of comprehensive data on venture capital financings, VentureSource suffers from missing valuations for equity and exit events.[3] Cochrane (2005) and Korteweg and Sorensen (2010) address the sample selection issues that arise from this missing data and the financing process. We use the estimated model in Hall and Woodward (2010) to impute equity valuations when it is miss-

[3] Kaplan, Sensoy, and Stromberg (2002) find that VentureSource exhibits no significant bias in coverage.

ing. Hall and Woodward (2010) address the problem using an outside database of approximately 1,000 venture capital financings with full and correct information. The sample allows estimation of a model that relates basic features of financings such as the sequence number and dollars invested to reported valuations.[4] The authors compare imputed valuations to those reported and find no significant bias. The relatively strong relationship between a small set of observables and entrepreneurial firm valuations confirms Bengtsson and Sensoy (2011) finding of significant contract inertia in venture capital term sheets over the life of a firm's investments. Approximately 26,000 or 51% of the financings require this treatment.[5] Fortunately, as the model predicts a negative relationship between debt and equity values, the major selection issues attenuate our estimates.

Using a set of 190 financings provided by a large venture capital firm, we compare the predicted valuations from the model to true valuations. A regression analysis with controls such as industry, year and firm region shows insignificant bias (mean, median difference of 0). Furthermore, a comparison of the reported valuations in VentureSource to the predicted valuations also shows no significant bias. The only way the predicted valuations could impact our empirical results is if the model systematically mis-predicts values before and after debt events with different bias. We find no evidence of such misspecification, and hence are confident with our imputation methodology that follows Hall and Woodward (2010).

Debt Event

We require a measure of leverage to test the empirical predictions about debt in venture capital contracts. VentureSource provides a financing classification that can separate equity and debt events. The latter include straight debt, credit, venture leasing (i.e. capital leases) and bridge loans. We focus only on the first three debt types, as VentureSource's methodology in recording historical bridge loans has changed over time. Further, the bridge round classification is often debt that is lent at the time of an equity raise that fully converts at the next equity event. Table

[4] See the Appendix in Hall and Woodward (2010) for the details.

[5] Results are insensitive to the inclusion of imputed valuations.

1 provides a count of debt events since 1997. Prior to 1997, debt was a less common feature of venture capital investments. Figure 2 show that debt issuance has increased dramatically since its fall in 2002. Over the last 5 years, debt accounted for about 6% of all venture capital dollars. Lerner (1994b) finds that the timings of initial public offerings and private financings by venture capital firms are procyclical and countercyclical respectively. Kaplan and Schoar (2005) investigate the performance and capital inflows of private equity partnerships, and find that at the industry level, fund performance is procyclical. Following this literature, we also note in Figure 2 that financing is procyclical and debt financing as a fraction of total financing is countercyclical in our sample.[6]

Debt raised by venture capital-backed firms have some features unique to the asset class. First, most debt contracts include warrant coverage of 7 - 10% of the principal. The main risk faced by lenders in this market is financing risk, i.e. will the entrepreneurial firm raise another equity round. If another financing round follows, the debt holders will receive the full principal back and potentially redeem their warrants. Next, entrepreneurial firms borrow the money from firms that specialize in lending to VC-backed firms. In the model, we combine the financing contract of all new investors, however in practice the financing may be done by multiple investors with varying contracts. This paper is silent on the issue of information asymmetry between various outside investors, and treats them as one combined entity. Last, the interest rates on the debt typically range from 10-15% and have 3-4 year payment schedules.[7]

Internal vs. External Debt

The VentureSource data provides a listing of the investors in each financing round. So for a financing event at time t, we can identify all the existing equity holders.[8] An internal debt round

[6]VentureSource appears to have excellent coverage of debt finance. Comparing the VentureSource coverage of debt events to that of the other major data provide VentureXpert (since 2001), there are over two times as many such financings in the former than the latter.

[7]Lerner (2000) discusses many of the typical features of venture debt.

[8]Secondary transactions where existing investors can sell their equity stakes are rare and if they occur, the investor sells a fraction of their stake.

is a round where all the investors (i.e. lenders) already invested in previous equity rounds. An outside debt round has all new investors, which can include both venture lenders and standard venture capital firms. Some 11% of the debt financings are missing any investor information, while less than 5% of equity financings lack any investor information. We assume that debt rounds without an investor are outside debt. The results are similar if we assign them as internal debt rounds. Outside debt accounts for 48% of the debt financings and 58% of the debt dollars since 1997.

Failed Equity Financings

Along with the financing outcomes covered in VentureSource, we also have a partial history of the fundraising activity of entrepreneurial firms raising equity finance. For example, a firm will inform VentureSource they intend to close a new financing round in the next quarter and are still seeking capital. We use this survey data on financing expectations to compare it to the final observed investment outcomes. Firms that fail to raise equity finance are more likely to have suffered some of the frictions the model posits drive the switch from equity to debt. Some firms met expectations by raising the equity financing, while others had an exit, raised equity much later than anticipated, shutdown or raised a non-equity financing. For 2003 - 2010, there are over 4,000 firms that informed the data provider of anticipated financings. These financings were 80% equity, 10% exit and 10% grant, non-equity or debt. The data also allows us to track the quality of the firms that both succeeded and failed to raise the anticipated security.

Venture Capital Contract Data

We also use the venture capital contract data available in VentureXpert from 2005 to 2010.[9] The contract features include the seniority of the equity holders, anti-dilution preferences and the payoff structure. The liquidation preference multiple of a venture capital contract maps to the parameter λ_e described in section 1. A liquidation preference multiple of 2X implies

[9]The data is similar to that used in Bengtsson and Sensoy (2011).

that a $10m investment is paid $20m before all other equity holders receive payment at exit. Table 2 shows the characteristics of the sample of contract features separate by rounds with increases and decreases in valuation. Full ratchet anti-dilution – full price protection – is in 8% of financings, while 10% of the financings have greater than 1X liquidation preference multiples. We will exploit the liquidation preference data as a proxy for the debt component in venture capital contracts.

2.2 Sample Description

Figure 3 shows the number of financings per year (non-exits) since 1990. A large increase in the fraction of debt financings occurred in 2010. The breakdown of debt is in basic debt, venture leasing (i.e. collateralized debt) and credit lines. Credit lines are offered by existing investors in the entrepreneurial firm, while debt and venture leasing is typically lent by firms that specialize in such securities.

Table 3 summarizes the three measures of firm quality for firms that did and did not receive debt: market to book (M/B), post-money valuation (i.e. valuation post-capital infusion) and pre-money valuation. If an exit event has a known valuation, we include it in the sample (including liquidations). None of the measures differ across the sub-samples, however, there is a slight difference in post-money valuations. The variable "After Debt" is equal to one for all equity or exit events after a firm's first debt event. Column 2 shows that 44% of the equity events of the average firm that raises debt occur after the debt round.

After cleaning the data,[10] we are left with 2602 firms that ever received debt out of total of 22,179 (11.7%). The average amount borrowed is $6.3m, which compares to an average equity investment of $8.3m. Table 4 provides further detail on the sample of firms, by industry, number of financings and geography. The difference test column in Table 4 presents the t-tests of the

[10]We exclude firms whose only financing is a debt round, because their capital structure is degenerate. We remove six firms that raised over $100m in debt as over 70% of all their capital raised came from large PE or hedge funds.

means of the variables by debt and non-debt firms where a negative values implies firms that issue debt had a larger value. Firms that issue debt are more likely to be biotech, still private and located outside of California and New York. Moreover, such firms are older and raise more capital, suggesting that VCs may use debt to sustain their investments. Firm characteristics remain similar even if only post-1997 sample is considered. We also compute firm's first debt financing as a fraction last equity capital raised. The median firm has no debt raised while the average debt level is 6%.

2.3 Testable Implications

The main features of the model sketched in Section 1 are as follows: (i) A VC invested in the firm might assess that the upside potential of the firm is less than previously anticipated. (ii) This leads to reduction in the price of equity which may make the next round of financing infeasible. This may be for reasons such as infeasibility of large transfer of control from entrepreneur to VC or due to inability of VC to convey negative information to the entrepreneur credibly. (iii) Debt provides an alternative source of financing in such a case rather than liquidating the firm, which is pareto-optimal if the firm's quality improves in the future. Thus, if the downward shock to firm quality reverses in the next round, debt provides an option that benefits both the VC and the entrepreneur compared to liquidation.

Thus the testable implications regarding the relationship between new financing and project quality are: (i) If a venture capital provider chooses a debt or debt-like contract features such as liquidity preference, then the venture capital provider has assessed the project's quality to be worse than the previous equity financed stage. (ii) If a new venture capital provider chooses a debt contract, then that too means lower future prospects. However, the decline in quality is less pronounced than when an inside VC finances the firm. (iii) The amount of financing in a debt round may be smaller and the length of debt stage financing may be shorter than equity. (iv) Ultimately, when the firm goes to external sources of financing, the past reduction in quality increases apprehension of outside investors regarding the value and future prospects of

the firm. (v) If a firm has revenues or is profitable, the information content of debt financing is lower.

The next section provides empirical evidence in support of the implications.

3 Empirical Evidence

3.1 Changes in Entrepreneurial Capital Structure

The main empirical analysis exploits the panel of financings, debt events and valuations. Implications (i) and (ii) say that some measure of debt borrowed by entrepreneurial firms predict within-firm changes to valuation or growth prospects. The borrowing process for VC financed firms limits the researcher's ability to calculate a measure of debt-to-equity. In particular, entrepreneurial firms rarely raise new equity until debt is paid off, or if they do, the data available does not reveal the information. Simply, the D/E at the time of an equity event is zero for most entrepreneurial firms. We construct a proxy for debt "Had Debt" equal to one if firm was financed using debt prior to any financing that period t. We also use a measure of the w_d, which is equal to the total capital borrowed over all last equity capital raised.

The unit of observation is the financing event of the entrepreneurial firm i, estimated with the following specification:

$$V_{i,t+1} = \alpha_i + \beta \text{Had Debt}_{i,t} + \gamma Z_{i,t} + \rho_t + \nu_{i,t}, \tag{8}$$

where V_{it} is a measure of firm quality at time $t+1$, α_i is the firm fixed effect, ρ_t are year fixed effects and $Z_{i,t}$ is a series of time-varying firm and market characteristics. $\nu_{i,t}$ is the idiosyncratic error that varies across firms and time. Each firm financing event is indexed by t; however, the time period between two financing events is not constant. The empirical predictions (i) and (ii) suggest that the presence of debt in an entrepreneurial firm's financing history is a negative signal of firm quality, so we expect $\hat{\beta} < 0$ on firm leverage. Finally, the fixed effects estimates from equation (8) control for any time-invariant differences between firms that issue debt such

as industry, VC quality or location.

Valuation

Table 5 presents the estimates from equation (8) using log firm valuation as a measure of firm quality. The dependent variable is the current firm post-money valuation, while the independent variable of interest is the indicator that a debt financing occurred in the past.[11] The sample includes firms that ever raised debt and had at least one post-debt equity event (exits included).[12] The variables "Profitable" and "Positive revenue" are binary variables to indicate such states at each of a firm's financing events. The "1 year Wilshire" return attempts to capture time-varying relationship between the market and entrepreneurial firm valuations. The fixed effects estimate of -0.59 for $\hat{\beta}$ in column (1) shows that post-money valuations fall by approximately 40% over all post-debt equity financings. Columns (2) and (3) exclude firm's who failed immediately after a debt round and any other type of exit post-debt. Similar results in the second column show that defaults (i.e. 0 post-debt equity values) do not drive estimates, and column (3) suggests that exits immediately after debt are not the sole source of the negative correlation.

The estimation technique in this case ensures that identification of impact of debt financing is made purely through within firm change in quality between the rounds when debt financing takes place as compared to the previous round. This result confirms implication (i), i.e. that investors finance the firm through debt before a significant fall in growth opportunities that represents firm quality. The last two columns in Table 5 replace the dummy for "After debt" with debt as a fraction of capital raised in the last equity round. The coefficient estimate has a different interpretation, but the model predictions of a negative relationship still hold.

To assess the relationship between debt and firm prospects (and implication (v)), Table 6 introduces interactions between the "After debt" variable and pre-debt firm quality measures.

[11] Results are similar with pre-money valuations.

[12] Specifications with the full sample of firms introduce a set of firms where "after debt" is zero for all observations and thus introduce noise in the relevant estimate.

"After debt X profitable" interacts the debt variable with a dummy equal to one if the firm reported profits before the debt financing (similar for "After debt X has revenues"). The statistically significant and positive coefficient estimates on the "After debt X profitable" show that profitable firms (rare in the data) who raise debt are much less likely to have post-debt falls in valuation. Overall, we find that the typical firm that borrows money does so prior to a fall in growth opportunities or valuation.

While our main point concerns the within-firm changes to value surrounding debt events rather than cross-section relationships, we also conduct cross-sectional comparisons between firms to see if debt as a negative signal affects firms success in terms of IPO or acquisition.

3.2 Debt Finance and Outcomes

In this section, we ask if venture capital debt is a negative signal for entrepreneurial prospects as measured by exit opportunities. If debt events lead to reduction in firm quality, then the ability of an entrepreneurial firm to have an IPO or be acquired firm should also diminish. Potential investors use the presence of debt in the firm's history as a signal that firm quality may not have completely recovered.

It is important to note that it is not the case that debt is endogenously reducing firm quality and probability of success, since VC-debt is paid off in the immediate next round after the debt financing round. Thus, at the time the firm accesses external financing, the VC-backed firm is likely all-equity financed. The argument we make is that presence of debt in the past, even though debt is not present anymore, signals VC's lower expectations regarding firm quality affecting external investors assessment of the firm.

We consider three measures of firm quality and outcomes for the cross-section analysis. First, we consider a dependent variable equal to one if the entrepreneurial firm exited via an initial public offering (IPO) or acquisition. This captures quality of the firm without any valuation distortions. Second, we use firm size as measured by log of observed exit value, which is zero in case the firm fails. As detailed by Korteweg and Sorensen (2010), the exit values over-represent

high-quality firms and in turn, attenuate the predictions of the mode. Finally, to capture a different dimension of firm success, we identify those entrepreneurial firms that had a CEO change in their history. We expect that firms who suffer the negative shocks as we model are also more likely to have a CEO change. All regressions include the variable "Had Debt" which is equal to one if the entrepreneurial firm ever raised debt and include controls for industry, year founded, region fixed effects, size and age. The sample includes only entrepreneurial firms founded prior to 2006 to give ample time for exit events.[13] Table 7 reports the results.

The unreported marginal effects suggest that a debt round is associated with an approximately 25% lower probability of an IPO or acquisition outcome (compared to the mean likelihood of 48%). This supports implication (iv) that when a firm having taken debt goes to external sources of financing, the past reduction in quality increases apprehension of outside investors regarding the value and future prospects of the firm. Firms that raise debt produce 23% lower exit values and have 12% more CEO changes. Even though the variation in the amount of debt is small (average debt is 2.4% of firm value) and the number of firms that take debt is small itself (and only 11% firms take debt in our sample), we attempt to use the amount of debt the firm takes as fraction of last equity round as the explanatory variable. An increase in the amount of debt in the financing round leads to lower probability of IPO and acquisition. The relationship is no longer statistically significant for exit value and CEO change, but importantly, the coefficient sign remains negative. Thus the signal content of having taken debt is more important in the cross-section than its level, which is the data is relatively small.

Liquidation Preference

Liquidation preference in equity contracts may also provide information about underlying firm quality. A liquidation preference of x units implies that in case of liquidation, the VC firm will have claims to $\$x$ for each dollar invested in the firm. Thus, liquidation preference in a typical equity financed VC contract is similar to debt in case of firm liquidation. Data available

[13]The results have the same directional predictions, but with less statistical significance using the full sample.

in VentureXpert built from a database built by VC Experts details the contract features in VC financings. Table 8 presents the cross-section and fixed effects logit regression of downward changes in equity valuations on the liquidation preference of contracts. The dependent variable is an indicator for whether the current financing has a lower valuation than the previous (i.e. a down round). A higher liquidation multiple in the current or previous financing events represents an increase in the debt-like features in VC equity contracts.[14] The binary variable ">1X Liq. Pref." equals one if the current or past financing events had a greater than 1X liquidation preference. The coefficient estimates suggest a strong correlation between the increase in this debt component of equity contracts and future changes in equity value, which mimics the relationship found between cash flow rights and value in Bengtsson and Sensoy (2011). We also include controls for senior equity or "participating preferred", each an additional form of downside protection.

Estimates in Table 8 show that several forms of debt components within equity contracts predict lower future equity values. The implied marginal effect for the liquidation preference variable predicts a 26% greater odds of a future down round for multiples greater than one. Similar relationships exist for senior equity (28% higher odds) and participating preferred stock (10% higher odds), however the last estimate does not have significant power. The inclusion of fixed effects for the most direct form of debt in Column 4 – liquidation preference – shows that within firm valuations tend to fall after increases in downside protections. The lack of significance in the last two columns likely stems from strong momentum in contract features as found in Bengtsson and Sensoy (2011) resulting in little within-firm variation in seniority or payoff structures. The evidence supports implication (i): if the new VC is apprehensive of the firm's ability to succeed, she requests a higher liquidation preference and/or seniority. The estimates expand on the results of Kaplan and Strömberg (2004) showing that larger external risks correlate with more debt-like features in VC contracts by investigating equity valuations

[14] We can include both current and past contract features because such features do not directly impact leverage and thus mechanical affect valuations.

over the entrepreneurial lifecycle.

3.3 Internal vs. External Debt

The model predicts that a lender's previous equity stake increases the likelihood of a positive growth option for debt finance. Thus, debt borrowed from outsiders – lenders or VCs without an equity stake – are less likely to predict fall in valuation. The reasoning is that the external lenders are calculating the expected return on debt, while an insider is calculating the return on debt and the growth option on equity stake already in the firm. Thus far we have shown that debt is a robust predictor of fall in firm valuation or cross-sectional outcomes. Now we test for the predicted differences in within-firm valuation and outcomes using variation in the source of debt.

Cross Section and External Debt

Some simple comparisons reveal that debt lent by internal VCs is different from debt where an outsider investor provides some or all of the funds. First, a measure of defaults shows that internal debt defaults about 30% more often than debt with outside lenders (4.2% vs. 5.9%). A default occurs when the firm reports failure and their last financing event was a debt round. If recovery rates differ by the debt source, then it is difficult to interpret the differences in these default rates. Next, outside debt rounds are 40% larger than internal debt rounds and the capital goes to older entrepreneurial firms. Last, there are no observable differences in reported profitability or revenue levels between the two debt sources. A multivariate analysis can provide further detail about how these differences translate into outcomes.

Table 9 introduces a further breakdown of debt events with an indicator for whether the lender was an external investor. We argue that these firms' lack of growth option from past equity stake results in a more stringent selection mechanism. Insofar as they are able to perform such screening and firm quality predicts outcome, we would expect to see differences in success rates and exit values by the source of venture debt. The variable "Outside debt" is equal to 1 if

the debt came from a non-equity holder. Column (1) results show that among the firms that obtain debt, firms that have obtained debt from external investors have a 24% higher probability of success (IPO/acquisition). Despite statistical insignificance, the coefficient on the "Outside debt" in the exit value and CEO change specifications flips from that of the full sample and suggests there is something different about these financings. A panel estimation done in the next section shows that indeed, debt from outside investors has approximately 50% lower impact on predicted falls in equity values.

Valuation and the Source of Debt

Table 10 repeats the panel estimators from section 3.1 with the sample broken into internal and outside debt events (the interaction term regression produces similar estimates). Comparing the "After debt" coefficient estimates between the two samples and across all specifications we see that debt has a less negative relationship with future equity values when provided by an external investor. All differences are statistically significant at 1% level. The estimates indicate that debt from outside investors has approximately 50% lower impact on predicted falls in equity values. Again, this suggests that outside investors select the quality deals or that internal investors are more likely to lend to marginally worse firms.

3.4 Who Lends to the Entrepreneurial Firm?

Venture capitalists often invest in syndicates (see Lerner (1994a)). We now consider two venture capital firms who invested I_0^a and I_0^b such that total capital invested $I_0 = I_0^a + I_0^b$. Does the decision on how to split the capital provide any predictive power on the individual VC's propensity to loan to the entrepreneurial firm? The growth option of debt should be larger for VC a if VC a invested more than VC b in the entrepreneurial firm. This leads to the testable implication (ii) discussed earlier: the fraction of capital invested by VC i by time t, $\frac{I_i}{\sum_j I_j}$ predicts the likelihood with which VC i lends to the entrepreneurial firm.

For each VC investor in an entrepreneurial firm with a syndicate size greater than 1, we

can track whether they invest in the next financing event. For those same financings, we have a measure of the fraction of dollars that each VC contributed and in turn, a variable to identify the largest VC investor(s). Testable implication (ii) suggests that conditional on a subsequent debt round, a VC with relatively more capital invested is more likely to lend money to the firm. Intuitively, these investors have relatively more to gain from the positive growth option. Of course, this prediction should also hold for equity rounds. Table 11 attempts to address the relationship between future participation and current equity stakes. We calculate the fraction of dollars provided by each VC syndicate member and then create a variable "Largest VC investor(s)" that equals 1 if the VC has the largest value (there can be ties). We track investment activity between each pair of subsequent financings.

Column (1) shows the full sample and ignores the type of follow-on financing type (i.e. debt or equity). Column (2) considers only financings followed by equity with the estimates on "Largest VC investor" now significant at the 10% level. The largest VC has a higher probability in participating in subsequent equity round than smaller investors. Column (3) introduces an interaction between the dummy variable for largest equity holder and an indicator for a subsequent debt round. If the option value is stronger for debt, the interaction term should be positive. We find just that for "Debt t + 1 x Largest VC." The implied marginal effects are about 16% higher probability of participation of the largest VC equity holder, in case its a debt round which is about 15% above the average of about 2%. The estimates provide additional evidence of venture debt's role as a growth option for internal VCs.

3.5 Failed Equity Financings

If debt is an alternative to equity pricing, then situations where entrepreneurial firms fail to raise equity capital should have a higher propensity to use debt. Further, the model shows the firms that switch to debt should have lower quality than those that found other financing alternatives. Such firms "shopped" their financing to the market and for a myriad of reasons could not convince others to invest. The data on financing expectations from 2003 provides a win-

dow on such outcomes. For the 4,000 firms that told VentureSource they aimed to raise equity finance, we can track whether they succeeded. Formally, we identify the financing expectations of a firm i with anticipated year-quarter closing t. The full database of financings gives us the final outcome in time "around" t (plus or minus two quarters).

Firms that failed to raise the anticipated equity financing can either exit, have no financing in the desired time period, raise debt or raise other equity financing at a much later date. For the 1,032 firms that failed to raise the equity finance they anticipated, 45% switch to debt, which is three times the fraction of debt in all financings from 2003 - 2010. Of course, lacking equity options, it is perhaps not that surprising they switch to debt. However, firms that switch from equity to debt are also 10% (66% versus 60%) less likely to be profitable or generating revenue that firms that failed to raise any capital or switch to other financing alternatives. Thus, lower quality firms that fail to raise equity are more likely to use debt as an alternative. Overall, these patterns of the firms who fail to raise the anticipated equity financing provide additional evidence of debt as a solution to frictions in venture capital equity pricing, supporting implication (i).

3.6 Debt vs. Equity

It is also instructive to compare the characteristics of debt and equity in venture capital. One testable implication (iii) is that debt finance should be relatively small and be followed by a new financing event relatively quickly. Simply, if debt is valuable as a growth option on the existing equity stakes, the VC wants to lend as little as possible given the negative expected return. In unreported regressions, capital raised in debt rounds is significantly smaller than similar (stage, age, industry and year) equity rounds. The time to the next financing event – if not a failure – is also faster. The faster time to next financing is robust to the smaller capital raised in the debt round. Last, we find that the fraction of new investors in the post-debt equity rounds is also higher than similar equity rounds. This results suggests another possible reason equity pricing becomes infeasible: a lack of sufficient outside equity capital.

3.7 Robustness Tests

The estimates of "After debt" in Table 5 are the average fall in valuation for all equity events after debt financing. Table 12 attempts to pin down the timing of the fall in valuation after a debt issue. The sample only include post-debt financings and the two dependent variables capture the likelihood a post-debt valuation is lower than the one observed immediately prior to the debt round. Columns (1) and (2) use the ratio of a post-debt valuation to the final pre-debt valuation as a dependent variable, while the last two columns use a dummy variable equal to one if this ratio is less than one.[15] Rather than using a variable "Had debt" that is one for all post-debt financings, we know have "After debt" and "2nd round after debt" that are one for each period post-debt. The estimates show that the negative relationship between post-debt financings and value is greatest for the financings immediately following the debt round, but also spreads to the second post-debt event. Columns (2) and (4) show that defaults where the firm value is very low are not driving the results. Overall, the timing of any post-debt falls in valuation decays over time. Lastly, Korteweg and Sorensen (2010) present an alternative selection correction that addresses the over-sampling of quality firms that have an IPO. Using the historical fraction of exit types – failures, acquisitions and IPOs – we re-estimate the base specification using the fractions as sampling weights. The unreported results are qualitatively similar to those in Table 5.

We address the sample selection and missing data issues surrounding venture capital investment data with the Hall and Woodward (2010) methodology. Sample selection in the data results in an over-representation of rounds for successful companies and less missing valuations for those rounds. Further, the time between financings of high-quality firms is typically shorter. How does this impact the inference in this setting? We present a model that suggests

[15] One can also label each equity financing as an "down round" when the valuation of the firm at time t is lower than the previous valuation. Precisely, the pre-money valuation at period t is lower than the post-money valuation at period $t-1$. With this as a dependent variable, we can ask whether a debt event predicts a subsequent down round. In unreported regressions, down rounds are more likely for equity rounds that follow debt.

debt predicts negative outcomes. Thus, the selection issues that plague the data will attenuate the estimated impacts without corrections. Table 13 repeats the analysis in Table 5 and provides similar conclusions. The mean dependent variables are larger for the selected sample (i.e. they are better firms), so as expected the estimated relationship is a smaller 9% fall in post-debt valuation.

Bridge rounds are a form of non-equity finance often provided by internal investors to their portfolio firms. Unfortunately, inconsistencies in the identification of such rounds forced us to exclude them from the sample of debt rounds. Such contracts look like fully-convertible bonds and do not immediately fit into the model predictions. However, the inconsistency disappears in late 2001, so we can address any potential bias from excluding these non-equity events from our debt definition. In unreported regressions, we repeat the main cross-sectional regressions in Table 5 with this new debt definition. The coefficient signs across the two debt definitions are the same, however, including bridge rounds results in a higher predicted exit value to capital raised and more CEO changes. The lack of attenuation suggests that the original definition captures the type of debt presented in the model.

Despite the rich detail available in VentureSource, we have throughout assumed that post-debt equity events correspond with debt payoff. However, it is possible that firms still have some debt on the books at the time of the post-debt equity event. If there is any relationship between such leverage and equity pricing, our estimates could be affected by it. Two types of debt provide a plausible test of this hypothesis: credit lines and venture leases. Such debt finance are unlikely to burden a balance sheet like a standard cash loan. Estimating the specifications in Table 5 with an additional indicator has no impact on the results. Furthermore, we repeat the analysis on firms that raised less capital in the post-debt equity event than the total capital raised and find the results unchanged. We conclude that debt in the capital structure for post-debt equity rounds is an unlikely source of the fall in valuations.

Finally, the observed within-firm changes valuations could be driven by two other factors. First, during the financial crisis of 2008-2009 the dollars available to venture-backed firms fell

dramatically as venture capitalists reacted to a weaker exit environment. Venture debt often acts as a secondary source of capital in such liquidity shocks and could thus introduce correlation between lower post-debt valuations stemming from the weaker public markets. Introducing dummies or explicit controls for the years of the financial crisis have no impact on the results in Table 5. Second, the results are insensitive to the inclusion of venture capital investor fixed effects and thus not driven by relationships between debt choice and investor type. Overall, the predictive power of debt finance for lower within-firm equity values is robust a large set of alternative explanations.

4 Conclusion

We study the informational content of the capital structure decisions of venture capitalists and entrepreneurs. Through a choice of financing contract, VCs provide signal that they project the firm's future growth to be lower than previously anticipated. These signals are persistent and predict a 33% lower equity valuation and ultimately 25% lower success probability. The empirical results hold in the cross-section and panel, allowing us to conclude that the relationship are unlikely to be driven by firm or investor effects. We present a model that is consistent with these empirical regularities and that provides further testable implications about the differences between debt provided by inside and external investors. Debt provided by insiders is a stronger predictor of valuation changes and failure probabilities. Support for this additional model hypothesis shows that debt maintains the real option to invest in the future and that frictions in equity pricing create a role for debt in venture finance.

There are some limitations to the conclusions that we can draw. First, the dearth of information on contracts for post-debt equity events forced our focus on equity prices. We estimate the average relationship between debt and future equity prices, but it may also be the case that high-quality firms issue debt as well (according to classical theories). However, the presence of such firms in our sample should only bias our results against finding that debt is a negative

signal.

The results and model point to fruitful research agenda that investigates how frictions between an inside investor and manager make equity pricing difficult. The model we present is agnostic on the source of such pricing difficulty. One can also extend the analysis to the entrepreneurial firms that eventually go public and have high insider equity ownership. In particular, many lenders of pre-IPO firms may own equity stakes and lend after the firm goes public. Finally, debt's role in the financial crisis as evidenced by Figure 4 suggests that a healthy debt market or ability of VCs to loan to their entrepreneurial firms can facilitate survival through liquidity shocks.

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5 Figures and Tables

Figure 1: Model Timeline

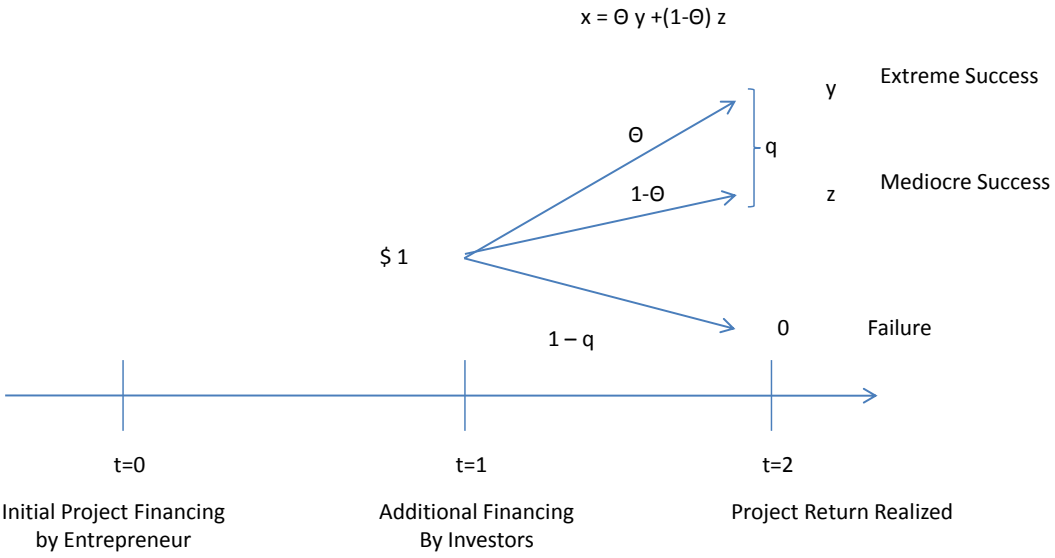
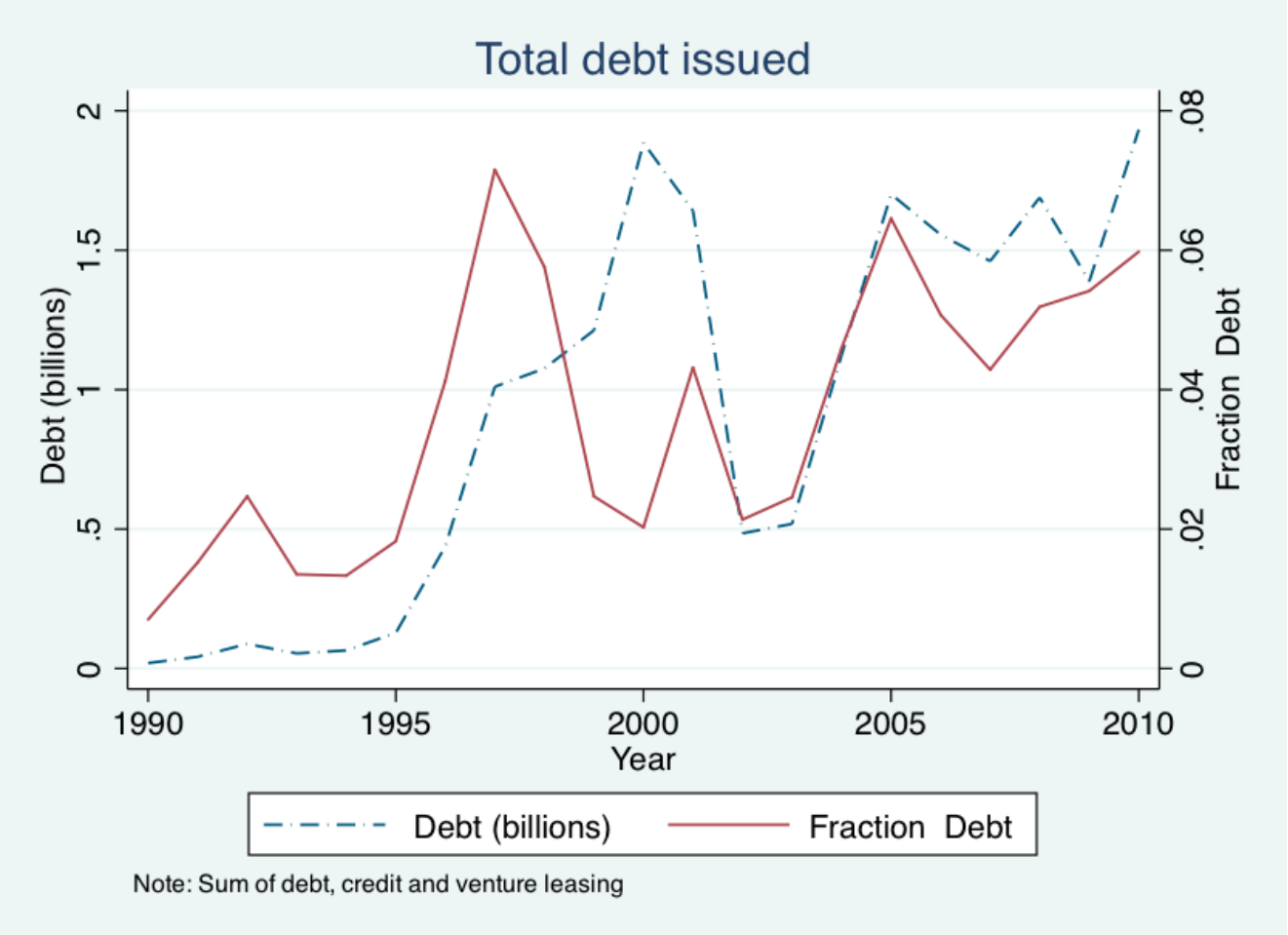


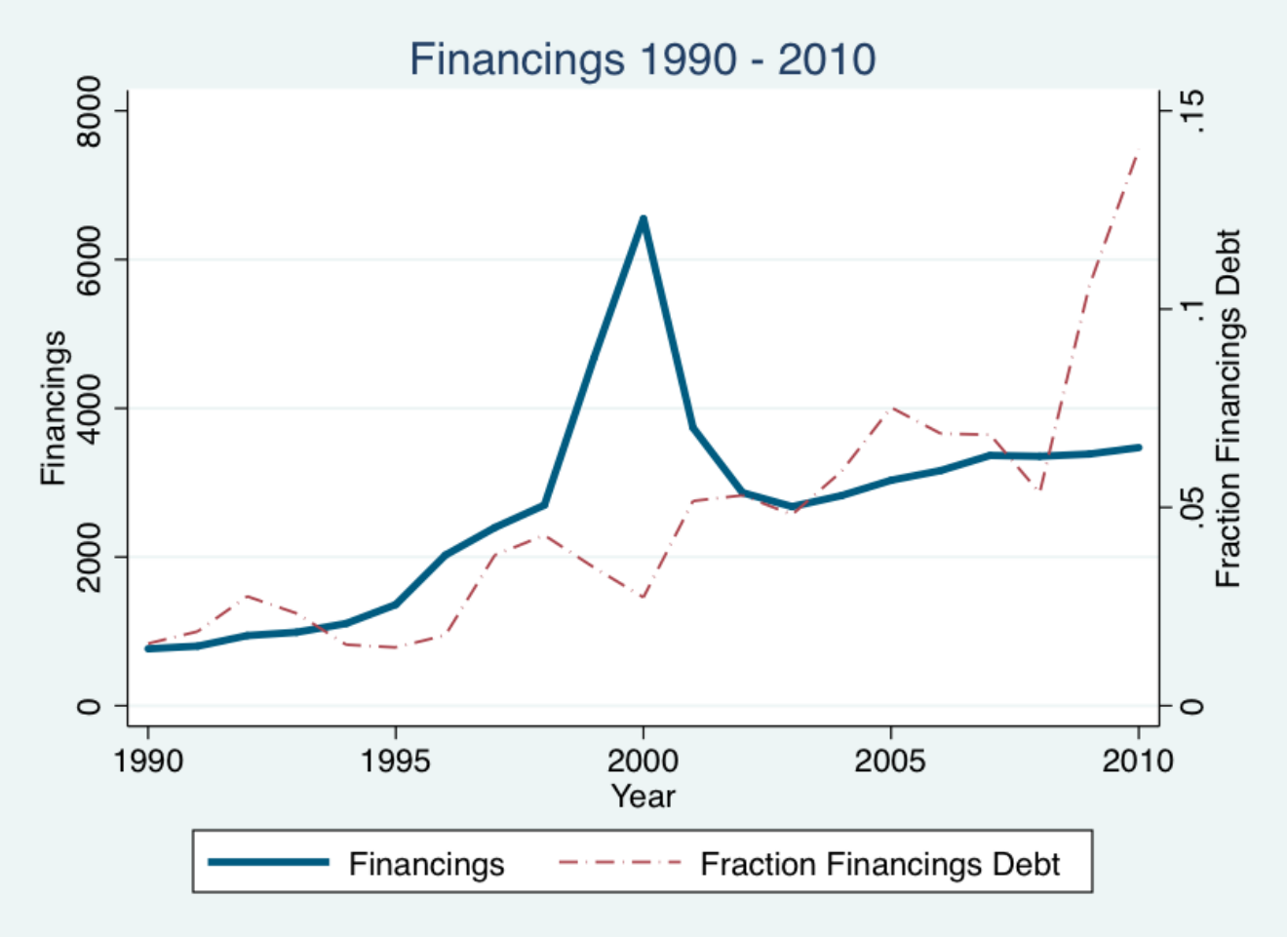
Diagram of the financing process timing and characteristics presented in the model of entrepreneurial financing.

Figure 2: Relation between Debt Volume and Debt as a Fraction of Overall Financing



Billions of dollars raised in various debt instruments by venture capital-backed entrepreneurial firms. "Fraction Debt" is the total debt raised in a given year divided by the total amount of capital raised in non-exit (e.g. non-IPO) equity investments. Source: VentureSource 1990 - 2010.

Figure 3: Total Financings over Time



Count of total equity and debt financings. "Financings" count for each year the number of non-exit debt and equity financings in venture capital-backed entrepreneurial firms. "Fraction Financings Debt" is the fraction of the these financings that debt. Source: VentureSource 1990 - 2010.

Figure 4: Venture Equity and Debt In Crises

"Log $ raised" is the log of the total dollars invested in equity events for venture capital-backed entrepreneurial firms (by quarter). "Fraction debt" is the fraction debt in all non-exit financings closed in a quarter. First vertical line is the peak of the Nasdaq index in 1999 and the second shows the quarter of the Lehman Brothers bankruptcy. Source: VentureSource 1990 - 2010.

Table 1: Debt Rounds over Time

Notes: Count of venture capital debt financings since 1997 broken down by type as defined by data provider VentureSource. "Credit" applies to all credit lines, credit facilities, and bank loans that the company receives. Note that there is no exchange of equity, but instead open lines of credit with a fixed or floating interest rate on the balance. "Loan" is a loan offered to the company, usually by management or one of its investors. "Debt" is a loan offered to the company from a venture bank or others not currently linked to the firm. "VL" or venture leasing includes investments in companies that have received at least one round of professional venture capital by corporate leasing agents who take payment in equity as well as debt. This is usually a debt round that includes a traditional debt structure and may include an equity component in the form of warrant coverage. Source: VentureSource 1990 - 2010.

Debt type	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Total
Credit	0	0	0	3	2	1	23	30	25	17	15	14	21	7	158
Debt	109	127	144	153	136	132	142	181	187	200	149	348	471	130	2609
Loan	0	0	0	1	1	0	11	20	11	24	27	15	22	3	135
VL	10	61	54	49	23	7	16	17	16	10	10	6	3	0	282
Total	119	188	198	206	162	140	192	248	239	251	201	383	517	140	3184
N	3184														

Table 2: VentureXpert data and contract features

Notes: Summary of the equity contract features available in the VentureXpert data from 2005 - 2010. All represent the percent of observations with contract data that have the feature. An "up round" is a financing where the valuation has increased since the previous investment, while a "down round" is one where it has fallen. "Senior Equity" gives the equity precedence in repayment over all other equity holders in liquidation events. ">1X liquidation multiple" is equal to one if the equity contract has more than 1X liquidation preference: for an investment of $\$x$m, the equity holder receives $2 * x$ in downside protection if 2X multiple. "Participating preferred" is a payoff structure that includes both downside protection and upside benefits. "Down/flat round" is one if the post-money valuation in the current round is lower than the previous. "Full Ratchet Anti-dilution" provides the strongest possible price protection in the face of falling prices.

	Up Round	Down/Flat Round	Total
Senior Equity	49.04	56.59	50.78
	(50.00)	(49.60)	(50.00)
>1X Liquidation Multiple	7.900	15.92	9.748
	(26.98)	(36.61)	(29.67)
Participating Preferred	63.63	67.36	64.49
	(48.12)	(46.93)	(47.86)
Full Ratchet Anti-dilution	8.382	10.93	8.970
	(27.72)	(31.23)	(28.58)
Financing year	2007.4	2007.8	2007.5
	(1.536)	(1.542)	(1.548)
$ raised (m)	14.96	8.335	13.43
	(19.69)	(11.34)	(18.32)
Observations	2698		

Table 3: Valuations of Debt vs. Non-Debt Firms

Notes: Summary of entrepreneurial firm financing characteristics for venture capital-backed firms in VentureSource. The column "Had Debt" includes only firms that ever raised debt rounds (as defined in Table 1). "Total" includes all entrepreneurial firms in the sample period and their non-exit financings. M/B is the reported valuation of the entrepreneurial firm over the lagged sum of capital raised as of the financing. "Lagged log K" is the total capital raised (log) as of the financing event. "Log post $" is the log of the entrepreneurial firm's equity valuation. It is the sum of the equity value at the financing event and the capital raised in that financing. "Log pre$" is the log of the former value. "After debt" is a dummy variable that is one for all financings after an entrepreneurial firms first debt financing. It is therefore 0 for firms that never raised debt, while the reported number is the fraction of financings after debt for those that borrow capital. Source: VentureSource 1990 - 2010.

	No Debt	Had Debt	Total
M/B	7.009	6.114	6.843
	(12.60)	(13.35)	(12.75)
lagged log K	2.030	2.524	2.122
	(1.395)	(1.431)	(1.415)
log post-$	3.006	3.377	3.075
	(1.689)	(1.468)	(1.657)
log pre-$	2.748	3.068	2.807
	(1.704)	(1.504)	(1.673)
After debt	0	0.436	0.0806
	(0)	(0.496)	(0.272)
Observations	37243		

Table 4: Characteristics of Firms that Do and Do Not Raised Debt

A comparison of entrepreneurial firm characteristics between firms that raise debt and those that do not. See Table 1 for description of debt events. Negative differences implies firms with debt had greater mean. t statistics in []. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ "Number financings" is the total financings the firm had before exit or as of the end of the sample. "Information technology" and "Biotech" are firm industry dummy variables. "Publicly-held" is a dummy for whether the entrepreneurial firm had an IPO and "Acquired" is a dummy for whether they were acquired. "Still private" indicates whether the firm was still privately-held as of the end of the sample. "Age at exit or end of sample" is the number of years between the firm's founding and the exit or end of sample. "Total capital raised" is the sum of all capital raised over the firm's life excluding the exit event (e.g. IPO). Source: Venture Source 1990 - 2010.

	No Debt	Had Debt	Total	Difference Test
Year founded	2000.5	2000.8	2000.6	-0.185
	(5.944)	(4.756)	(5.810)	[-1.45]
Founded California	0.395	0.344	0.389	0.0441***
	(0.489)	(0.475)	(0.488)	[4.29]
Founded Massachusetts	0.104	0.111	0.105	-0.00874
	(0.305)	(0.315)	(0.307)	[-1.36]
Founded New York	0.0621	0.0376	0.0591	0.0272***
	(0.241)	(0.190)	(0.236)	[5.40]
Number financings	3.070	4.054	3.193	-1.078***
	(1.699)	(2.019)	(1.772)	[-29.38]
Information Technology	0.518	0.457	0.510	0.0581***
	(0.500)	(0.498)	(0.500)	[5.51]
Biotech	0.203	0.291	0.214	-0.0925***
	(0.402)	(0.454)	(0.410)	[-10.81]
Publicly-held	0.0977	0.0756	0.0949	0.0158**
	(0.297)	(0.264)	(0.293)	[2.64]
Out of Business	0.213	0.127	0.203	0.0779***
	(0.410)	(0.334)	(0.402)	[9.34]
Acquired	0.279	0.252	0.276	0.0391***
	(0.449)	(0.434)	(0.447)	[4.09]
Still private	0.392	0.508	0.406	-0.113***
	(0.488)	(0.500)	(0.491)	[-10.95]
Age at exit or end of sample (yrs)	3.313	5.207	3.550	-1.988***
	(3.065)	(3.448)	(3.178)	[-29.55]
Total capital raised (log $)	2.286	3.069	2.384	-0.783***
	(1.561)	(1.453)	(1.569)	[-23.54]
Observations	19577	2602	22,179	

Table 5: Valuation before and after debt

Notes: Fixed effects regressions of entrepreneurial firm post-money valuation on a series of controls. Sample includes all equity financings for venture capital-backed firms founded after 1990 that had at least one debt financing in their history and at least an equity event pre- and post-debt event. We exclude firms that never raised debt as the variable of interest cannot be identified otherwise. Column (2) "No defaults" excludes firms that shutdown after the debt event before another financing. Column (3) "No exits" excludes firms whose debt event was immediately followed by any type of exit. A debt event includes loans, lines of credit and venture leasing, but does not include bridge loans due to inconsistencies in the VentureSource data. If the dependent variable is unavailable, the valuation is imputed using the model of Hall and Woodward (2010) (See Section 2.1). "After debt" is equal to one for all equity financings or exit events that occur after a debt financing. "Debt / Last equity" is the debt amount over the previous equity capital raised interacted with the "After debt" variable (after winsorizing the ratio). "Firm age" is the age in years of the entrepreneurial firm at a financing event. "Profitable" is equal to 1 if the firm reported profits and "Positive Revenue" is equal to 1 if the firm reported revenues. The variable "1 year Wilshire return" is the return on the Wilshire 5000 from one year prior to the financing. Round FE are dummies for the financing round sequence and Year FE are fixed effects for the year of the financing. Standard errors in parentheses, clustered at the firm level to address serial correlation in the error term. * , **, *** represent significance at the 10%, 5% and 1% level respectively.

	All firms	No defaults	No exits	All firms	No exits
	(1)	(2)	(3)	(4)	(5)
After debt	-0.589***	-0.407***	-0.580***		
	(0.0534)	(0.0509)	(0.0581)		
Debt/Last Equity				-0.120***	-0.121***
				(0.0415)	(0.0461)
Profitable	0.536***	0.377***	0.519***	0.484***	0.457***
	(0.109)	(0.108)	(0.124)	(0.117)	(0.137)
Positive revenue	0.387***	0.265***	0.445***	0.415***	0.443***
	(0.0542)	(0.0548)	(0.0591)	(0.0578)	(0.0628)
Log firm age (yrs.)	0.0243	0.0367	0.00572	0.0614*	0.0328
	(0.0338)	(0.0344)	(0.0390)	(0.0352)	(0.0405)
Log round no.	0.608***	0.794***	0.525***	0.313***	0.218***
	(0.0612)	(0.0613)	(0.0697)	(0.0653)	(0.0727)
1 year Wilshire ret.	0.363***	0.356***	0.291**	0.370***	0.273*
	(0.126)	(0.123)	(0.138)	(0.135)	(0.148)
Observations	7851	7386	6210	6839	5384
R^2	0.269	0.284	0.254	0.247	0.232
Firms	1987	1838	1508	1847	1406
Firm FE?	Y	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y	Y

Table 6: Valuation: firms with and without revenues

Notes: Fixed effect regressions of entrepreneurial firm valuation on a series of controls. Sample includes all equity financings for venture capital-backed firms founded after 1990 that had at least one debt financing in their history and at least an equity event pre- and post-debt event. A debt event includes loans, lines of credit and venture leasing, but does not include bridge loans due to inconsistencies in the VentureSource data. The interaction terms "After debt X profitable" and "After debt X has revenues" interact the post-debt dummy with a variable equal to one if the firm was profitable or had revenues prior to the debt event (respectively). If the dependent variable is unavailable, the valuation is imputed using the model of Hall and Woodward (2010). "After debt" is equal to one for all equity financings or exit events that occur after a debt financing. "Debt / Last equity" is the debt amount over the previous equity capital raised interacted with the "After debt" variable (after winsorizing the ratio). All other variables as defined in Table 5, excluded for space. Standard errors in parentheses, clustered at the firm level to address serial correlation in the error term. * , **, *** represent significance at the 10%, 5% and 1% level respectively.

	All firms	No defaults	No exits	All firms	No exits
	(1)	(2)	(3)	(4)	(5)
After debt	-0.807***	-0.430***	-0.782***		
	(0.0976)	(0.0901)	(0.101)		
After debt X profitable	0.813***	0.440***	0.694***		
	(0.155)	(0.149)	(0.188)		
After debt X has revenues	0.113	-0.140	0.104		
	(0.102)	(0.0961)	(0.107)		
Debt/Last Equity				-0.0119**	-0.0106*
				(0.00561)	(0.00562)
Debt / last equity X profitable				0.0362	0.0245
				(0.0337)	(0.0383)
Debt / last equity X has revenues				0.0177***	0.0176***
				(0.00514)	(0.00515)
Profitable	0.286**	0.124	0.344**	0.672***	0.707***
	(0.128)	(0.125)	(0.162)	(0.120)	(0.139)
Positive revenue	0.422***	0.316***	0.519***	0.502***	0.590***
	(0.0603)	(0.0609)	(0.0686)	(0.0645)	(0.0715)
Observations	7851	7386	6210	7006	5534
R^2	0.183	0.206	0.162	0.144	0.124
Firms	1987	1838	1508	1847	1406
Firm FE?	Y	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y	Y
Additional controls?	Y	Y	Y	Y	Y

Table 7: Debt in the Cross-Section

Notes: Cross-sectional regressions using the sample of entrepreneurial firms founded prior to 2003. The "IPO/Acq." probit regressions has a dependent variable is 1 if the entrepreneurial firm exited via IPO or acquisition as of the end of the first quarter of 2011. log(Exit value) is the log of the final sale price of the firm at IPO, acquisition (if reported) or at shutdown (set to 20% of total capital raised). "CEO Change" is a binary variable equal to one if the firm had multiple CEOs (using a probit regression). "Had debt round" is equal to 1 if the firm ever issued debt. "Debt / last equity" is the debt raised over the previous equity financing (0 if no debt raised). "Total capital raised" is the sum of all capital raised by the entrepreneurial firm. "Age at exit or end of sample" assumes the first observed investment is the founding date of the entrepreneurial firm and define age as the number of years to an exit or end of the sample (3/31/2011). "Number financings" is the log total number of financings. All regressions include controls for region and industry. "Region FE" are dummies for firms founded in California, Massachusetts and New York. Standard errors in parentheses. * , **, *** represent significance at the 10%, 5% and 1% level respectively.

	IPO/Acq.	log(Exit value)	CEO Change	IPO/Acq.	log(Exit value)	CEO Change
	(1)	(2)	(3)	(4)	(5)	(6)
Had debt round	-0.298***	-0.383***	0.0836*			
	(0.0335)	(0.114)	(0.0427)			
Debt / last equity				-0.241**	-0.267	-0.0369
				(0.109)	(0.269)	(0.143)
Total capital raised (log $)	0.198***	0.982***	0.0500***	0.197***	0.976***	0.0594***
	(0.00881)	(0.0201)	(0.0118)	(0.00902)	(0.0200)	(0.0128)
Age at exit or end of sample (yrs)	-0.00385*	-0.00177	0.0306***	-0.00433*	-0.00225	0.0289***
	(0.00218)	(0.00430)	(0.00285)	(0.00226)	(0.00431)	(0.00301)
log number financings	0.122***	-0.907***	0.492***	0.120***	-0.924***	0.478***
	(0.0273)	(0.0613)	(0.0429)	(0.0282)	(0.0613)	(0.0464)
Observations	14998	6506	10204	14240	6506	8745
R^2		0.403			0.402	
Pseudo R^2	0.131		0.082	0.132		0.064
Year founded FE?	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Region FE	Y	Y	Y	Y	Y	Y

Table 8: Liquidation preference and valuations

Notes: Dependent variable is one if the financing round had lower or same valuation than the previous. Table 2 defines many of the control variables. ">1X Liq. Pref" is equal to 1 if the current or any past financings had a liquidation preference multiple greater than 1X (the norm). "Past Senior Equity" equals one if the current or past financings have any senior equity, while "Past Partic. Pref." is equal to one if any of the current or past financing contracts included participating preferred stock (another form of downside protection for equity holders). "Log $ raised" is the log of the investment amount and "Time Since Last" is the number of years since the previous financing event. Columns 1-3 presents the estimates from a logit in the cross-section and Column 4-6 presents the estimates from the fixed effect logit estimator with the entrepreneurial firm as the unit of observation. The fixed effects logit requires at least one down round and one up round per entrepreneurial firm, so the sample is smaller and cannot accommodate year dummies (random effects logit has similar results). All financings occur after 2004 due to the data constraints in VentureXpert and VC Experts. Standard errors clustered at the entrepreneurial firm. * , **, *** represent significance at the 10%, 5% and 1% level respectively.

	Flat/Down? Logit	Flat/Down? Logit	Flat/Down? Logit	Flat/Down? FE Logit	Flat/Down? FE Logit	Flat/Down? FE Logit
	(1)	(2)	(3)	(4)	(5)	(6)
> 1X Liq. Pref	0.319**			0.853**		
	(0.129)			(0.403)		
Past Senior Equity		0.340**			-0.236	
		(0.0942)			(0.364)	
Past Particip. Pref.			0.143			-0.116
			(0.101)			(0.591)
Time Since Last (yrs.)	0.200**	0.193**	0.201**	0.568**	0.539**	0.534**
	(0.0476)	(0.0475)	(0.0475)	(0.132)	(0.141)	(0.141)
Log $ raised	-0.568**	-0.590**	-0.575**	-0.718**	-0.717**	-0.725**
	(0.0420)	(0.0424)	(0.0420)	(0.114)	(0.121)	(0.120)
Observations	2743	2743	2743	690	690	690
Pseudo R^2	0.098	0.101	0.097	0.149	0.229	0.228
Firms	1945	1945	1945	272	272	272
Firm FE	N	N	N	Y	Y	Y
Year FE?	Y	Y	Y	N	N	N
Round # FE?	Y	Y	Y	N	N	N

Table 9: Debt in the Cross-Section: External Investors

Notes: Cross-sectional regressions using the sample of entrepreneurial firms founded prior to 2006. Sample only includes firms that ever raised debt and compares outcomes by the source of that debt. The "IPO/Acq." column present a probit regression with the dependent variable of 1 if the entrepreneurial firm exited via IPO or acquisition as of the end of the first quarter of 2011. log(Exit value) is the log of the final sale price of the firm at IPO, acquisition (if reported) or at shutdown (set to 20% of total capital raised). "CEO Change" is a binary variable equal to one if the firm had multiple CEOs (using a probit regression). "Outside debt" is 1 if the firm raised debt from an investor who did not already own equity in the firm. "Total capital raised" is the sum of all capital raised by the entrepreneurial firm. "Age at exit or end of sample" assumes the first observed investment is the founding date of the entrepreneurial firm and define age as the number of years to an exit or end of the sample (3/31/2011). "Number financings" is the log total number of financings. All regressions include controls for region and industry. Standard errors in parentheses. * , **, *** represent significance at the 10%, 5% and 1% level respectively.

	IPO/Acq.	log(Exit value)	CEO Change
	(1)	(2)	(3)
Outside debt	0.243***	0.435**	-0.0726
	(0.0647)	(0.215)	(0.0794)
Total capital raised (log $)	0.108***	1.020***	0.0294
	(0.0297)	(0.118)	(0.0351)
Age at exit or end of sample (yrs)	0.0163**	0.0407*	0.0187**
	(0.00683)	(0.0227)	(0.00829)
log number financings	0.460***	-0.977***	0.221**
	(0.0828)	(0.346)	(0.110)
Observations	2018	557	1278
R^2		0.416	
Pseudo R^2	0.132		0.062
Industry FE?	Y	Y	Y
Year founded FE?	Y	Y	Y

Table 10: Valuation over time: external debt

Notes: Fixed effects regressions of entrepreneurial firm valuation on a series of controls. Sample includes all equity financings for venture capital-backed firms founded after 1990 that had at least one debt financing in their history and at least an equity event pre- and post-debt event. A debt event includes loans, lines of credit and venture leasing, but does not include bridge loans due to inconsistencies in the VentureSource data. The dependent variable is the post-money valuation. If unavailable, the valuation is imputed using the model of Hall and Woodward (2010). "No default" excludes all the financings of firms that failed after a debt round and "No exits" excludes the financings of firms who borrowed immediately prior to an IPO or acquisition. Columns labeled "Inside" are those debt rounds financings completely by internal investors, while "Outside" columns have debt lent by at least one investor not an existing equity holder. All other variables as defined in Table 5. Standard errors in parentheses, clustered at the firm level to address serial correlation in the error term. * , **, *** represent significance at the 10%, 5% and 1% level respectively.

	All firms Inside	All firms Outside	No default Inside	No default Outside	No exits Inside	No exits Outside
	(1)	(2)	(3)	(4)	(5)	(6)
After debt	-0.863***	-0.459***	-0.578***	-0.324***	-0.741***	-0.518***
	(0.104)	(0.0624)	(0.101)	(0.0592)	(0.121)	(0.0660)
Profitable	0.516***	0.496***	0.331*	0.376***	0.648***	0.416***
	(0.189)	(0.130)	(0.185)	(0.130)	(0.223)	(0.143)
Positive revenue	0.473***	0.304***	0.289***	0.227***	0.648***	0.310***
	(0.0940)	(0.0662)	(0.0978)	(0.0663)	(0.109)	(0.0700)
Log firm age (yrs.)	0.0308	0.00622	0.0584	0.0125	0.0351	-0.0353
	(0.0575)	(0.0406)	(0.0600)	(0.0411)	(0.0711)	(0.0448)
Log round no.	0.458***	0.714***	0.667***	0.865***	0.283**	0.696***
	(0.0930)	(0.0789)	(0.0932)	(0.0796)	(0.109)	(0.0893)
1 year Wilshire ret.	0.206	0.485***	0.133	0.494***	0.130	0.419**
	(0.211)	(0.162)	(0.201)	(0.159)	(0.230)	(0.177)
Observations	2802	5049	2561	4825	2105	4105
R^2	0.255	0.292	0.249	0.311	0.243	0.277
Firms	746	1238	673	1163	535	970
Firm FE?	Y	Y	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y	Y	Y

Table 11: Who invests in inside debt?

Notes: The dependent variable is 1 if the venture capital investor in a financing invested in the subsequent financing event with a probit specification. So for a VC that invests in firm i at time t will have a dependent variable equal to one if the invest in the $t+1$ financing. The unit of observation is a venture capitalist in an investment syndicate, so there are at least two observations for each financing. Column (2) has financings followed by only by equity. "Largest VC(s) investor t" is a dummy for the VC with the largest (may be ties) investment in the previous financing. "Debt t+1" is one if the subsequent financing is a debt round and "Debt t+1 X Largest VC" interacts the two. The variable "log dollars raised" is the log of the total financing amount and "VC experience" is the log of the total number of financing events the VC has invested in as of immediately prior to the financing event. "Log round no." is the log of the round number and "Log $ raised" is the log of the dollars invested in the round. Syndicate size is the total number of investors in the financing. Standard errors in parentheses, clustered at the financing level. *, **, *** represent significance at the 10%, 5% and 1% level respectively.

	All financings (1)	Equity (2)	All, interactions (3)
Largest VC(s) investor t	0.0211*	0.0250*	0.0129
	(0.0128)	(0.0137)	(0.0137)
Debt $t+1$			-1.355***
			(0.0422)
Debt $t+1$ x Largest VC			0.151***
			(0.0491)
log round no.	0.141***	0.167***	0.192***
	(0.0148)	(0.0151)	(0.0146)
log dollars raised	-0.127***	-0.0768***	-0.0950***
	(0.00937)	(0.00977)	(0.00944)
VC experience (# inv.)	0.0326***	0.0393***	0.0370***
	(0.00299)	(0.00320)	(0.00308)
Log syndicate size	-0.227***	-0.238***	-0.253***
	(0.0215)	(0.0224)	(0.0218)
Observations	68105	62572	68105
Pseudo R^2	0.024	0.019	0.082
Financings	20871	19204	20871
Industry FE?	Y	Y	Y
Year FE?	Y	Y	Y

Table 12: Valuation over time: timing of change

Notes: Sample includes post-debt equity events of firms that raise debt finance. The setup mimics that of Table 5 where we now include dummies for the timing after a debt event rather than a variable that is one for each post-debt event. Columns (1) and (2) use a dependent variable that is the ratio of the post-debt valuation over the last equity valuation prior to the debt round. So a larger value implies an increase in post-debt valuation. Columns (3) and (4) use a simple dummy variable equal to one if the value of a particular post-debt financing is lower than the last pre-debt valuation. "First round after debt" is one for the first round after debt finance and similarly for "Second round after debt." Thus, the excluded category is all rounds after such rounds. A debt event includes loans, lines of credit and venture leasing, but does not include bridge loans due to inconsistencies in the VentureSource data. If unavailable, the valuation is imputed using the model of Hall and Woodward (2010). Columns are again defined as in Table 5. Other control variables mimic those in Table 5 with the inclusion of industry and financing year fixed effects (not reported). Standard errors in parentheses, clustered at the entrepreneurial firm level. *, **, *** represent significance at the 10%, 5% and 1% level respectively.

	Post-debt value / pre-debt value		Value < pre-debt value?	
	All firms	No defaults	All firms	No defaults
	(1)	(2)	(3)	(4)
Round after debt	-0.342***	-0.298**	0.445***	0.342***
	(0.125)	(0.123)	(0.120)	(0.121)
2nd round after debt	-0.192**	-0.210**	0.329***	0.351***
	(0.0869)	(0.0882)	(0.113)	(0.114)
Profitable	0.340	0.226	-1.014***	-0.821***
	(0.209)	(0.221)	(0.174)	(0.180)
Positive revenue	0.0374	-0.0627	-0.349***	-0.174
	(0.168)	(0.181)	(0.106)	(0.115)
Log firm age (yrs.)	-0.0672	-0.0495	0.272***	0.278***
	(0.0669)	(0.0680)	(0.0903)	(0.0947)
Log round no.	-0.346***	-0.289**	0.670***	0.633***
	(0.126)	(0.128)	(0.153)	(0.158)
1 year Wilshire ret.	0.157	0.176	-0.418*	-0.445*
	(0.222)	(0.223)	(0.247)	(0.249)
Observations	2732	2642	3661	3544
R^2	0.032	0.032		
Pseudo R^2			0.048	0.048
Specification	OLS	OLS	Logit	Logit
Firms	1819	1714	1819	1714
Firm FE?	N	N	N	N
Industry FE?	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y

Table 13: Valuation before and after debt: no imputation

Notes: Fixed effects regressions of entrepreneurial firm post-money valuation on a series of controls. Sample includes all equity financings for venture capital-backed firms founded after 1990 that had at least one debt financing in their history and at least an equity event pre- and post-debt event. A debt event includes loans, lines of credit and venture leasing, but does not include bridge loans due to inconsistencies in the VentureSource data. The dependent variable is the entrepreneurial firm's post-money valuation, which is only used if reported in VentureSource. This sample contrasts with those above that use imputed valuations from Hall and Woodward (2010). "After debt" is equal to one for all equity financings or exit events that occur after a debt financing. "Debt / Last equity" is the debt amount over the previous equity capital raised interacted with the "After debt" variable (after winsorizing the ratio). Columns are defined as in Table 5. Other control variables mimic those in Table 5 with the inclusion of industry and financing year fixed effects (not reported). Standard errors in parentheses, clustered at the firm level to address serial correlation in the error term. * , **, *** represent significance at the 10%, 5% and 1% level respectively.

	All firms	No defaults	No exits	All firms	No exits
	(1)	(2)	(3)	(4)	(5)
After debt	-0.147***	-0.120***	-0.164***		
	(0.0418)	(0.0413)	(0.0481)		
Debt/Last Equity				-0.0214	-0.0131
				(0.0327)	(0.0365)
Profitable	0.160	0.172*	0.0794	0.114	0.0301
	(0.0990)	(0.101)	(0.119)	(0.107)	(0.132)
Positive revenue	0.0353	0.0184	0.0129	0.0367	0.00376
	(0.0443)	(0.0449)	(0.0528)	(0.0459)	(0.0553)
Log firm age (yrs.)	0.0996***	0.0717**	0.130***	0.106***	0.137***
	(0.0290)	(0.0283)	(0.0346)	(0.0297)	(0.0347)
Log round no.	0.731***	0.807***	0.675***	0.664***	0.588***
	(0.0517)	(0.0517)	(0.0670)	(0.0529)	(0.0673)
1 year Wilshire ret.	0.215*	0.231**	0.229*	0.243*	0.250*
	(0.118)	(0.116)	(0.133)	(0.127)	(0.144)
Observations	3689	3388	2827	3266	2480
R^2	0.811	0.806	0.806	0.809	0.805
Firms	1410	1275	1076	1322	1007
Firm FE?	Y	Y	Y	Y	Y
Year FE?	Y	Y	Y	Y	Y