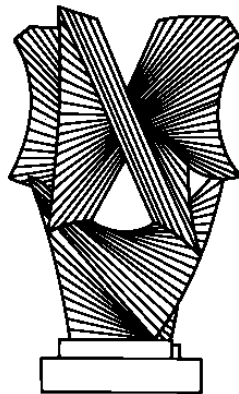


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FINANCIAL CONTRACT DESIGN IN THE WORLD OF VENTURE CAPITAL

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Financial Contract Design in the World of Venture Capital

George G. Triantis[†]

The Venture Capital Cycle. Paul Gompers and Josh Lerner.
MIT, 1999. Pp ix, 375.

INTRODUCTION

Over the past decade, venture capital is credited with fueling economic growth, cultural change, and financial exuberance. Technological advances have dramatically reduced the cost of information, with a tremendous economic impact. In the financial sphere, venture capital is regarded as the frontier of innovation, liberated from the regulation and precedents of traditional markets. Therefore, the time may be ripe to evaluate whether valuable financial innovation has taken place in fact. In *The Venture Capital Cycle*, Professors Paul Gompers and Josh Lerner assemble an empirical examination of various aspects of venture capital financing in a highly informative and thought-provoking volume. Their analyses and results provide material with which we might assess the contributions of venture capitalists to the design and understanding of financial relationships.

Financial economists regard much of security design as the task of minimizing the cost of information. Financial intermediaries play important roles in bridging information asymmetries and monitoring entrepreneurs on behalf of their investors. Gompers and Lerner focus on the venture capital partnership as the intermediary between investors and high-technology start-ups. The venture capitalist's counterpart in the old economy is the commercial bank. The authors describe a venture capital cycle that is functionally very similar to the relationship between banks and their borrowers.¹ Both intermediaries finance start-ups until these firms establish reputations that enable them to raise capital in public markets, at which time the intermediaries withdraw their investments and either return them to their investors or recycle them in new start-ups. The authors imply that this cycle is somehow unique to venture capital and that venture capitalists have developed novel approaches to resolving information problems. However, I suggest below that the techniques they describe (such as restrictive covenants, redemption rights, and staged investments) have functional counterparts in bank financing. The important distinction lies instead in a feature that Gompers and Lerner do not discuss:² Venture capi-

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¹ "Venture capital can be viewed as a cycle that starts with the raising of a venture fund; proceeds through the investing in, monitoring of, and adding value to firms; continues as the venture capitalist exits successful deals and returns capital to their investors; and renews itself with the venture capitalist raising additional funds" (pp 3–4). A significant difference between the two cycles may be the limited term of the venture capitalist partnership that compels the distribution to investors, who then choose whether to reinvest with the same general partner in a new fund.

² The book does not include the work on convertibles by one of the authors. See Paul A. Gompers, *An Examination of Convertible Securities in Venture Capital Investments*, Harvard Business School Working Paper (April 1997).

tal contracts have demonstrated a preference for convertible securities rather than short-term secured credit, the paradigmatic financial security held by banks.³

Part I reviews the informational challenges of financial contracting, particularly the problems associated with information asymmetry and agency costs. Professors Gompers and Lerner identify several contractual patterns that address these problems in venture capital contracts. Part I compares these features with those of conventional bank financing and suggests that none of the techniques adopted by venture capitalists is particularly novel. Instead, they have close functional parallels in bank financing of similarly situated firms. Part II turns to the most significant distinction between much of venture capital and bank financing: banks hold senior, short-term debt and venture capitalists hold convertible securities. This contrast is relatively easy to explain. Banks are prevented by law from holding equity interests.⁴ High-technology start-ups have low liquidation values and volatile going concern values that compel them to offer equity-linked securities to their investors. Part II reviews the advantages of convertibles as analyzed in finance scholarship and thereby explains why these securities are more distinctive to venture capital than the contract features examined by Gompers and Lerner.

Although Professors Gompers and Lerner focus on the venture capital cycle as a solution to information and incentive problems, they also suggest that venture capital contracting may not always be efficient. Specifically, they argue that the supply of venture capitalists is slow to adjust to fluctuations in demand (p 4). During periods of heightened demand and capital inflows to venture capital partnerships, general partners negotiate a compensation premium in the form of diluted contractual restrictions on the extraction of private benefits, instead of a larger share of the monetary returns (pp 31–33). The authors demonstrate an empirical association between periods of high demand and less restrictive covenants in limited partnership agreements (pp 45–48). Part III of this Review argues, however, that their hypothesis rests on a set of tenuous theoretical premises. In particular, venture capitalists are unlikely to exercise their enhanced bargaining power (if any) in times of heightened investor demand by contracting for inefficiently weak constraints on their activity rather than higher monetary compensation. In light of the sophistication of most investors in venture capital partnerships, the authors' suggestion that covenant dilution is less transparent than changes in profit sharing arrangements seems implausible. An alternative explanation for their empirical finding is that high investor demand is correlated with positive economic conditions and low risks of failure. These, in turn, suggest reduced incentive for misbehavior by general partners and greater returns from preserving their flexibility.

³ Steven N. Kaplan and Per Stromberg, *Financial Contracting Theory Meets the Real World: An Empirical Analysis of Venture Capital Contracts*, University of Chicago Working Paper (April 1999); William A. Sahlman, *The Structure and Governance of Venture-Capital Organizations*, 27 J Fin Econ 473 (1990).

⁴ 12 USC § 24(7) (1994 & Supp 1998). However, the Gramm-Leach-Bliley Financial Modernization Act, Pub L No 106-102, 113 Stat 1338 (1999), codified in scattered sections of title 12, now allows banks to form "financial holding companies." A financial holding company may underwrite and deal in securities, and it may acquire equity interests incidental to these financial activities.

I. THE ECONOMICS OF FINANCIAL INTERMEDIATION: VENTURE CAPITALISTS VERSUS BANKS

A. Information and Agency Problems

In the jargon of economics, financial contracts are incomplete. They are entered into in uncertain environments, and they fail to exploit even available information (for example, probability distributions) because of two obstacles. First, some information is observable by only one party (the entrepreneur) who cannot credibly communicate it to others (information asymmetry). Second, the parties cannot control post-financing behavior by contract because either the behavior itself or future states of the world cannot be verified by third party arbiters (agency problems). These two problems motivate the design of financial contracts.

Suppose that an entrepreneur seeks start-up financing from an investor. The entrepreneur has information about the technological and economic prospects of the proposed venture, but a portion of that information is too soft to be communicated to investors in a credible manner. As a result, the investor's ability to distinguish among entrepreneurs is impaired and the investor will tend to assume the worst case scenario that is consistent with observable information. This information asymmetry increases the entrepreneur's cost of capital.

When the economic environment is uncertain, the ability to adjust the venture over time in light of new information is a valuable asset. For example, it may become efficient to expand or contract the venture, to accelerate or decelerate its development, or to abandon it. These options would seem to be best placed in the hands of the most informed party, the entrepreneur. After the investor has committed her capital to the venture, however, the entrepreneur maximizes his private benefits from control without regard to the investor's interests. This incentive cannot be controlled by contract because the judicial identification of a substantial portion of inefficient private benefit extraction relies on facts that are not verifiable. For example, entrepreneurs are inclined to continue and expand their ventures even when their contraction or termination is efficient. Yet, it is difficult for the parties to specify, and the courts to verify, those states of the world in which the venture should be expanded or contracted.

Therefore, with respect to information that is privately held by the entrepreneur, the parties face a difficult choice among financing contracts. Due to the underlying uncertainty and information asymmetry, the parties cannot specify in verifiable terms the efficient actions of the entrepreneur in every possible future state of the world. If the entrepreneur has unfettered discretion to react to changes in information, the gains from flexibility are offset by agency costs. If, however, the discretion is removed from the entrepreneur and left with the investor, the value of the flexibility is compromised by the inferior information of the investor. In addition, the investor may use her discretion to exploit the cost to the entrepreneur of switching financing unexpectedly in midstream, in order to renegotiate and extract a higher share of the return from the venture.

B. Financial Intermediation

Financial intermediaries attenuate the information obstacles impeding the financing of start-up ventures in five ways. First, intermediaries exploit economies of specialization, scale, and scope in the gathering and processing of information. In addition, by disclosing to a single

intermediary instead of dispersed public investors, each entrepreneur avoids the risk of sensitive information spilling to other contracting partners and to competitors. Thus, intermediaries can bridge some of the information asymmetry that exists between entrepreneur and investor. The intermediaries apply this information to distinguish more finely among entrepreneurs of varying quality and to police them after releasing the funds. Although intermediation is costly, the entrepreneur may benefit from a net decrease in the cost of capital. Second, investment analysts and advisors may underinvest in information production because they do not retain all the benefits of their efforts. Their advice can easily pass to investors who do not pay for it, and all stakeholders benefit from the resulting discipline imposed on the entrepreneur. In contrast, financial intermediaries take a stake in the entrepreneur's venture and thereby capture a larger portion of the gains from information production.⁵

Third, the entrepreneur can renegotiate financing terms with a single intermediary at lower cost than if he were financed under separate contracts with numerous investors.⁶ For example, the parties may need to renegotiate conditions under which the entrepreneur must liquidate the firm or pursuant to which the intermediary will contribute additional capital. However, the superior information of the intermediary enhances its ability to hold up the entrepreneur in these renegotiations: the intermediary has knowledge of the entrepreneur's sunk investments and the cost of obtaining alternative financing from another source.⁷ Fourth, a longer term relationship between intermediary and entrepreneur enhances the economies of information production and mitigates the risk of opportunistic behavior by either party. The relationship, and the prospect of its continuance, allows the intermediary and entrepreneur to react quickly to changes in information in order to exploit real options. Fifth, the intermediary's future profits depend on its building and preserving a reputation, and this further constrains opportunism by the intermediary.

Banks and venture capitalists are two types of financial intermediaries between investors and start-up organizations. These organizations are too young, too volatile, and have too little of a track record to raise capital directly from investors in public markets. Each intermediary enjoys superior access to relevant information relative to its respective investors, partly because each has other links to the entrepreneur. For example, both intermediaries are important sources of financial and strategic advice. Banks provide a host of other services, particularly demand deposit accounts, that yield significant information about the entrepreneur's activities and financial condition.⁸ Moreover, the parties to bank lending or venture capital financing can exploit the information observable by the intermediaries and their ongoing relationship to ad-

⁵ Hayne E. Leland and David H. Pyle, *Informational Asymmetries, Financial Structure, and Financial Intermediation*, 32 J Fin 371, 383 (1977). Some benefits are nevertheless externalized because other investors can observe the intermediary's investment. For example, there is evidence that the stock market responds to new loans and renewals. However, the bank can extract the value of this certification from its borrower, who enjoys the lower cost of capital. See, for example, Matthew T. Billett, Mark J. Flannery, and Jon A. Garfinkel, *The Effect of Lender Identity on a Borrowing Firm's Equity Return*, 50 J Fin 699 (1995); Scott L. Lummer and John J. McConnell, *Further Evidence on the Bank Lending Process and the Capital-Market Response to Bank Loan Agreements*, 25 J Fin Econ 99 (1989); Christopher James, *Some Evidence on the Uniqueness of Bank Loans*, 19 J Fin Econ 217 (1987).

⁶ Clifford W. Smith, Jr. and Jerold B. Warner, *On Financial Contracting: An Analysis of Bond Covenants*, 7 J Fin Econ 117, 151–52 (1979).

⁷ For an analysis in the case of banks, see Raghuram G. Rajan, *Insiders and Outsiders: The Choice between Informed and Arm's-Length Debt*, 47 J Fin 1367 (1992).

⁸ Mitchell A. Petersen and Raghuram G. Rajan, *The Benefits of Lending Relationships: Evidence from Small Business Data*, 49 J Fin 3, 8, 14–16 (1994).

just their contract over time. This financing flexibility is extraordinarily valuable to start-up firms, whose value is locked in growth options, and who produce too little cash flow or earnings to have internal capital at their disposal.

However, intermediaries remain less informed than the entrepreneurs and therefore do not completely resolve the incentive problems caused by the self-interest of entrepreneurs. Therefore, there are returns to innovation in intermediary-entrepreneur contracts that are explored below. The investor-intermediary contract is affected by the same types of information obstacles that impair the intermediary-entrepreneur relationship: (1) the intermediary has private information about its portfolio and (2) it has incentives to act in a self-interested manner, sometimes contrary to the interests of investors, that cannot be simply controlled by contract. Gompers and Lerner indicate, for example, that venture capitalists may skew investments in order to enhance their personal reputations and experience in specialty areas, such as leveraged buyouts, with a view to raising a new fund in those markets (pp 31, 42). Bankers may have the same types of aspirations. The mechanisms that intermediaries use to reduce these agency problems are simply versions of those used in their contracts with entrepreneurs. The important difference for our comparison is that bank deposits are insured by the Federal Deposit Insurance Corporation, and banks are policed by federal bank regulators. This obviates the need for privately negotiated terms between the bank and its depositors.

Gompers and Lerner observe that venture capital partnership agreements address informational concerns through a combination of compensation design and restrictions on verifiable components of the inefficient behavior.⁹ Thus, they reveal that covenants in venture capital limited partnership agreements restrict the types of investment and the amount that may be invested in any given venture (pp 38, 41). Covenants also restrict the size of funds and the participation of venture capitalists in other partnerships (p 41). The explicit compensation of venture capitalists is a combination of a fixed management fee (usually, a percentage of the fund's capital or assets) and a variable performance-based return (a percentage of the profits). The function of the variable component might be to establish incentives to promote effort or to signal the qualities of the venture capitalist—but not both. Gompers and Lerner reveal that greater variability is found in the compensation of older, established venture capitalists than their younger counterparts (pp 57–58). They explain this result on the basis that new venture capitalists are sufficiently motivated by a desire to develop a reputation, such that the marginal incentive improvement from performance-based returns is outweighed by the marginal increase in the risk-bearing cost borne by risk averse managers (p 81). In contrast, senior venture capitalists with established reputations may be in their final fund and therefore more responsive to performance-based compensation.

Gompers and Lerner note that their data belie the alternative hypothesis that younger venture capitalists might signal their abilities by accepting a larger portion of their payoff in variable compensation (p 81). In contrast, the abilities of established venture capitalists are revealed in their track records. The authors suggest provocatively that the signaling hypothesis may fail

⁹ In the context of venture capital partnerships, Gompers and Lerner suspect that the organizational structure of the intermediary may not be an important factor in its success. For example, they find that venture funds sponsored by corporations (implicitly, intermediaries between the corporate shareholders and entrepreneurs) achieve returns that are as good as those of venture capital partnerships, especially when they focus their investments in areas of strategic overlap with their parent firm (pp 119–20).

because the asymmetry in information regarding the venture capitalist's probability of success may not be present to begin with. They conjecture that young venture capitalists may not be any better at predicting their abilities than their investors are (pp 81–82).¹⁰

C. Venture Capital and Bank Financing Compared

The contract between intermediary and entrepreneur is of greater interest for the purposes of this Review. The bulk of venture capital, and certainly the bulk of successful venture capital, is invested in the high-technology sector. The value of these high-technology companies is in their growth options rather than in their marketable assets. These companies are characterized by high market-to-book values, low liquidation values, low ratios of tangible to total assets, high research and development (“R&D”) investments, and negative cash flows. Information asymmetries are more severe, and fewer factors are observable, much less verifiable. Furthermore, in the absence of tangible assets, the opportunity for misbehavior is greater, and monitoring is more difficult. Therefore, the contracting task appears more formidable in the industries financed by venture capital rather than bank lending.

Nevertheless, the financial contracts of banks and venture capitalists are strikingly similar in design, with the notable exception of conversion rights discussed in the next Part. The most common venture capital security is a convertible preferred stock or subordinated debenture that is either convertible into common stock or accompanied by warrants for the purchase of common stock. Start-up firms often have negative earnings or cash flows in their early stages, and therefore the security typically does not provide for mandatory periodic payment of either interest or dividends. Its liquidation rights are senior to common stock, but sometimes junior to other creditors of the start-up firm. The convertible security contains restrictive covenants, whose violation triggers the right of the venture capitalist to redeem its investment. In addition, venture capitalists often hold majority voting rights and representation on the board of directors. In their recent empirical work, Professors Kaplan and Stromberg observe that many venture capital contracts condition control rights on contingencies such as the attainment of performance milestones.¹¹ Venture capitalists are often given preemptive rights to participate in future rounds of financing (for example, to maintain their pro rata share of the equity in their start-up venture).

In contrast, banks hold senior or secured short-term debt. These contracts are typically in the form of a line of credit that finances working capital and term loans that finance capital investments. Bank borrowers typically enjoy more fruitful cash flow than technology start-ups and therefore are more likely to agree to make periodic interest payments. The security interest covers most of the assets of the start-up, including not only tangible collateral such as equipment and inventory, but also intangibles such as patents and receivables. In light of this broad priority, the borrower often finds it difficult to obtain funding for future projects from another

¹⁰ Gompers and Lerner explain that

[t]he venture capital industry may require skills that were not used in venture capitalists' previous employment [V]enture capitalists argue that it is difficult to predict success of new partners in advance. Meanwhile, investors are sophisticated institutions that closely track performance. It is reasonable to expect that neophyte venture capitalists do not know their own investment abilities any better than their investors do. (pp 81–82).

¹¹ Kaplan and Stromberg, *Financial Contracting Theory Meets the Real World* at 21, 48 (cited in note 3).

lender. Therefore, like the preemptive rights of venture capitalists, banks effectively have a right of first refusal on future financing. Loan agreements have extensive covenants, the violation of which are events of default that trigger acceleration and foreclosure against the assets of the borrower. Like the redemption rights in venture capital securities, these enforcement rights permit the bank to withdraw its investment and compel the termination of the venture.

A helpful perspective from which to compare venture capital and bank contracts is the manner in which they control the flexibility options of the venture: specifically, how they divide discretion with respect to these options between the entrepreneur and the intermediary in each case. The discretion of the entrepreneur is limited by restrictive covenants that prohibit, for example, liquidation, merger, sale of assets, borrowing, or payment of dividends, and other fundamental changes. Violation triggers the right of the intermediary to withdraw its investment, through either the refinancing of the entrepreneur or liquidation of the firm. Therefore, the covenants effectively give the bank or venture capitalist veto power with respect to these decisions and require the entrepreneur to negotiate the ability to pursue the proscribed courses of action. As noted above, the superior information held by the intermediary facilitates these bargains, particularly when the relationship with the entrepreneur and reputational concerns control the risk of opportunistic behavior.

In bank financing, security interests complement covenants in minimizing agency costs. The foreclosure of collateral is much quicker than the judicial enforcement of unsecured debt. The sanction for covenant violation is accordingly more severe. In addition, two other features of secured debt further restrict the discretion of the entrepreneur to adjust the venture: Security interests generally follow collateral assets into the hands of transferees, and they generally grant first-in-time priority over subsequent lenders. As a result, they prevent the entrepreneur from pursuing private benefits by substituting assets or borrowing against collateral assets. Security interests thereby limit the flexibility of entrepreneurs to reallocate capital in order to maximize private benefits.¹² However, they also threaten to prevent the efficient adjustments in the venture in response to new information acquired by the entrepreneur. As in the case of overinclusive covenants, the entrepreneur may be required to negotiate the consent of the secured creditor to new financing.¹³ This obstacle is overcome to the extent that the creditor is an informed intermediary in a relationship with the entrepreneur. Even without renegotiation, however, the restrictions of security interests are sufficiently textured to permit the sales of some assets (in the ordinary course) and some borrowing (for example, purchase money security). This permits an entrepreneur to make some efficient adjustments in the venture without being subject to the holdup of its secured lender.¹⁴

Although agency problems may be more acute in technology start-up firms, venture capitalists cannot easily restrict opportunistic reallocation of capital through security interests because of the paucity of significant tangible assets that can serve as collateral. Venture capitalists contract instead for voting control and representation on boards of directors, and use these powers to withdraw their investments by liquidation, refinancing, or other forced sale of the venture. Board representation might also offer a distinct governance lever to banks, which could

¹² George G. Triantis, *A Free-Cash-Flow Theory of Secured Debt and Creditor Priorities*, 80 Va L Rev 2155, 2158–65 (1994).

¹³ Thomas H. Jackson and Anthony T. Kronman, *Secured Financing and Priorities Among Creditors*, 88 Yale L J 1143, 1173 (1979).

¹⁴ George G. Triantis, *Financial Slack Policy and the Laws of Secured Transactions*, 29 JLegal Stud 35 (2000).

supplement the effect of covenants and security interests. It might also provide access to soft information that cannot be readily provided for in credit agreements. In fact, banks often do have representatives on the boards of their borrowers. Perhaps due to the specter of lender or fiduciary liability, bankers are less likely to sit on boards of smaller, more volatile firms. If banks were permitted to hold convertible securities, their interests would conflict less with those of the shareholders; they may consequently be more welcomed on boards by shareholders and somewhat less at risk of liability.¹⁵

In venture capital and bank financing, the intermediary and entrepreneur have some flexibility in the timing of the investment. To the degree that they can postpone the commitment of the investor's funds, they can contract in light of better information (both more and shared information) and less uncertainty. Under less uncertainty, it is easier to control the behavior of the entrepreneur by contract. Of course, the cost of waiting may outweigh these benefits: in particular, the venture may be undertaken by a competitor. However, if the cash requirements are divisible over time, the parties may space or stage their contracts so that the funds are advanced only at the time they are needed. The strategy also minimizes the amount of free cash available to the entrepreneur and thereby reduces the scope for misbehavior. Both venture capitalists and banks contract over future financings. Venture capitalists often have preemptive rights to participate in future rounds of stock issues in order to preserve their share of the equity. Bank lenders hold blanket security interests over the assets of their borrowers that give them priority over future creditors and consequently deter financing from competitors.¹⁶ These rights, however, enhance the power of the venture capitalist or bank to hold up the entrepreneur in the negotiation of later rounds of funding. In this context as well as others, the relationship of the parties and the intermediaries' concern with their reputations are crucial constraints against opportunistic behavior.

Venture capitalists stage their investments in entrepreneurs. Gompers and Lerner find that the duration of each stage is correlated with the industry ratio of tangible to total assets, and inversely related to higher R&D intensities (pp 156–57). These variables reflect the portion of the venture's value that is locked up in growth options, rather than tangible assets, and, in turn, indicate the degree of information asymmetry. In cases of more severe information obstacles, venture financing is divided into a larger number of smaller staged investments. The age of the company is only sometimes a relevant variable. While it has a significantly positive impact on financing duration in the case of low-technology firms, it does not have a significant effect with high-technology firms. The authors speculate appropriately that asymmetries may tend to persist longer in high-technology firms, thereby increasing the value of delaying investment decisions (p 165).

Banks preserve flexibility through a technique that is different in form, but very similar in effect. Banks sequence term loans and link them to asset acquisitions. Moreover, they provide working capital through lines of credit and lending commitments. Under the terms of these

¹⁵ Randall S. Kroszner and Philip E. Strahan, *Bankers on Boards: Monitoring, Conflicts of Interest, and Lender Liability*, J Fin Econ (forthcoming 2001), available online at <<http://gsbwww.uchicago.edu/fac/randall.kroszner/research/bankers.pdf>> (visited Nov 19, 2000). However, lender liability seems to be concerned more with intracreditor conflict, rather than creditor-shareholder conflict. George G. Triantis and Ronald J. Daniels, *The Role of Debt in Interactive Corporate Governance*, 83 Cal L Rev 1073, 1096–1103 (1995).

¹⁶ Robert E. Scott, *A Relational Theory of Secured Financing*, 86 Colum L Rev 901, 926–27 (1986). Scott notes that this security interest gives the lender control over the future financing prospects and thereby encourages investment by the lender in nurturing the borrower.

agreements, banks typically retain their discretion to review periodically new information about the borrower and refuse requests to draw on credit lines.¹⁷ Renegotiation lies at the heart of financing flexibility in relational bank lending, whether it concerns the waiving of events of default, the extension of fresh financing, or the rescheduling of payment obligations. The same is true in the venture capital relationships where the parties negotiate sequential rounds of financing, covenant violations, or the allocation of voting rights and seats on the board. In both contexts, the parties exploit real options by delaying decisions until some uncertainty is resolved and by controlling the incentives to renegotiate opportunistically within their ongoing relationship.¹⁸

The value and role of intermediaries diminish with the severity of information asymmetry and agency problems, and entrepreneurs eventually seek to substitute direct investment from investors. The direct public financing is raised by the sale of securities that carry more standardized terms than the contracts with former intermediaries. In the case of bank lending, mature borrowers who have built a reputation for repaying debts can issue debt directly to investors without an intermediary.¹⁹ Venture capitalists exit in a similar fashion when the firm makes an initial public offering of its securities.²⁰ In both cases, the reputation of the intermediaries serves a credentialing function that enhances the ability of the firm to access investors directly. The exit of the venture capitalist and the bank is followed by a new cycle of intermediate investment in another start-up.

II. CONVERTIBLE SECURITIES

The discussion in Part I concerns the information obstacles to efficient capital allocation and reallocation. An investor (or intermediary) is concerned about the expected return and risk of the entrepreneur's proposed venture. The value of the venture depends on the ability to exploit flexibility in adjusting to new information: expanding or contracting, accelerating or decelerating, shifting to a new venture or liquidating. The party with the best information to manage this flexibility is the entrepreneur because much of this information is not observable by investors, let alone verifiable. However, the entrepreneur has incentives to maximize private benefits and may not make efficient decisions. We have seen that governance tools such as covenants, liquidation rights, staged investments, voting rights, and representation on the board of directors contribute to realize the value of the various real options while containing agency problems.

The design of the financial or cash flow rights is also important to maximizing flexibility and minimizing agency costs. There are several reasons why an entrepreneur with substantial private information may borrow rather than sell stock. The decision of an entrepreneur to issue a security may reflect his observation that investors overvalue the venture. Therefore, investors

¹⁷ In a much criticized opinion, the Court of Appeals for the Sixth Circuit reviewed a lender's exercise of its discretion to refuse its borrower's request to draw on a line of credit. *K.M.C. Co, Inc v Irving Trust Co*, 757 F2d 752, 760–63 (6th Cir 1985). Most courts, however, do not interfere with contractual rights of lenders to cut off financing. See, for example, *Kham & Nate's Shoes No. 2, Inc v First Bank of Whiting*, 908 F2d 1351, 1357 (7th Cir 1990); *In re Clark Pipe & Supply Co*, 893 F2d 693, 700 (5th Cir 1990).

¹⁸ In the case of banks, this process is well described in Professor Scott's work on relational secured financing. Scott, 86 Colum L Rev at 901 (cited in note 16).

¹⁹ Douglas W. Diamond, *Monitoring and Reputation: The Choice between Bank Loans and Directly Placed Debt*, 99 J Pol Econ 689, 713 (1991).

²⁰ Sahlman, 27 J Fin Econ at 479 (cited in note 3). See also Bernard S. Black and Ronald J. Gilson, *Venture Capital and the Structure of Capital Markets: Banks Versus Stock Markets*, 47 J Fin Econ 243, 245 (1998).

tend to apply a discount in pricing securities issued by a firm. Debt is a fixed claim with liquidation priority over stock, which insulates its returns somewhat from the marginal risk of overvaluing the borrower. Therefore, the discount on debt is smaller than on equity contracts, and the entrepreneur may choose debt financing for that reason.²¹ In addition, outside equity investors might be concerned that their entrepreneur may misrepresent or manipulate the reporting of cash flow or earnings in order to reduce their share of any distributions. A debtholder, in contrast, is entitled to foreclose on the assets of the borrower if its fixed payment obligations are not met.²² Therefore, debt claims may also be preferable when earnings are not verifiable. Moreover, fixed interest payments remove free cash with which insiders might otherwise inflate their private benefits. By limiting the insider's access to cash, these payment obligations may compel the termination of projects whose prospects have become unprofitable.²³ Finally, short-term debt in particular signals that insiders view the firm's prospects optimistically and expect to be able to refinance at a lower cost of capital when this information is revealed to the market.²⁴

The value of debt securities and their ability to serve the functions described in the previous paragraph are compromised in the financing of start-up technology ventures because (1) their value is found in growth opportunities and other real options rather than in tangible assets with significant liquidation values and (2) these ventures typically have negative earnings and cash flows. Therefore, venture capitalists invest in combinations of debt and equity interests. The most common security held by venture capitalists is a fixed claim (such as debt or preferred stock) with provisions for the conversion of this claim into common stock. Conventional convertible debt gives the security holder the option to trade its debt for common stock in the issuer. The instrument defines the time during which the option may be exercised and also often grants to the issuer the right to call the debt in order to induce the convertible debt-holder to convert. In venture capital deals, conversion is triggered not by the exercise of an option, but by the occurrence of specified events or contingencies; notably upon a successful initial public offering of stock (defined by offering price, net proceeds, or otherwise).

Convertible fixed claims may serve the following functions. First, like short-term debt, convertible debt also might defer the sale of equity until private information is revealed to the market.²⁵ However, while short-term debt has a definite maturity, convertible debt defines periods within which the holder may convert, permits the issuer to force conversion by exercising its call privilege, or triggers mandatory conversion upon the occurrence of a qualifying initial public offering. Therefore, the time at which the favorable information is revealed does not have to be predicted with as much precision when convertible, rather than short-term, debt is used to defer the issuance of equity.²⁶ In the meantime, the firm might also signal its confidence in the

²¹ Stewart C. Myers and Nicholas S. Majluf, *Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have*, 13 J Fin Econ 187 (1984).

²² Robert M. Townsend, *Optimal Contracts and Competitive Markets with Costly State Verification*, 21 J Econ Theory 265 (1979).

²³ Michael C. Jensen, *Agency Costs of Free Cash Flow, Corporate Finance and Takeovers*, 76 Am Econ Rev No 2 323, 324 (1986).

²⁴ Douglas W. Diamond, *Debt Maturity Structure and Liquidity Risk*, 106 Q J Econ 709 (1991); Mark J. Flannery, *Asymmetric Information and Risky Debt Maturity Choice*, 41 J Fin 19 (1986).

²⁵ Diamond, 106 Q J Econ at 709 (cited in note 24).

²⁶ Alexander J. Triantis and George G. Triantis, *Conversion Rights and the Design of Financial Contracts*, 72 Wash U L Q 1231, 1236–37 (1994).

impending disclosure of positive information by assuming significant fixed obligations, sometimes with periodic interest or dividend liability, until it can reveal the favorable information.²⁷

Second, the risk of debt in start-up technology firms is much greater than in conventional borrowers because of the inferior cash flow and liquidation value in the former case. If the debtholder were to be compensated simply by a rate of interest, that rate would have to be very high. High interest rates exacerbate an adverse selection problem: the borrowers who are most likely to agree to pay high interest are the most risky ones. High interest rates also increase agency problems by intensifying the incentive of borrowers to choose more over less risky projects. Although intermediation mitigates somewhat the underlying information asymmetry, lenders may nevertheless decline to lend funds to high-risk borrowers even at high interest rates.²⁸ These adverse selection and incentive problems are avoided through convertible securities that structure the return to the investor as a share of future gains in value rather than rights to fixed interest.

Third, to the extent that they can control decisionmaking, the residual interests in leveraged companies have the incentive to increase the riskiness of the firm's activities. This incentive may be controlled to some extent by covenants. However, as noted earlier, covenants employ proxies that are under- and overinclusive. To the extent that they are overinclusive, they must be renegotiated. If the information is still unobservable, renegotiation may be difficult. Moreover, the lender has hold-up potential, although this is mitigated in the case of intermediaries. To the extent it remains unresolved, the hold-up potential is of greater concern when the borrower is likely to have many investment opportunities. Convertible securities offer an alternative mechanism for addressing the problems of risk alteration. They permit the venture capitalist to participate in the firm's profits and consequently dampen the risk-taking incentives of the entrepreneur who now shares the upside with the convertible security holder.²⁹ At the same time, convertibles do not impede the exploitation of growth opportunities as do covenants.³⁰ This solution, however, has limits: it does not prevent the exacerbation of risk alteration incentives when the debtor is insolvent or near insolvency and the conversion option is far out of the money.

Fourth, a pure debt claim restricts the ability of the entrepreneur to obtain new capital without the consent of its creditors, particularly if it is senior or secured.³¹ On the other hand, a pure equity claim makes subsequent financing too easy. Convertibles offer a third approach between giving discretion entirely to the entrepreneur and requiring renegotiation with the holders of outstanding debt. If the venture succeeds in its early stages, it can compel the conversion of the venture capitalist's claim into equity (for example, by meeting performance targets or executing a successful IPO). Upon the extinction of the debt, the entrepreneur is relieved of periodic interest payment obligations and gains new capacity to borrow in order to finance his op-

²⁷ Jeremy C. Stein, *Convertible Bonds as Backdoor Equity Financing*, 32 J Fin Econ 3, 9 (1992).

²⁸ Joseph E. Stiglitz and Andrew Weiss, *Credit Rationing in Markets with Imperfect Information*, 71 Am Econ Rev 393 (1981).

²⁹ Richard C. Green, *Investment Incentives, Debt, and Warrants*, 13 J Fin Econ 115 (1984); Robert A. Haugen and Lemma W. Senbet, *Resolving the Agency Problems of External Capital Through Options*, 36 J Fin 629 (1981); Smith and Warner, 7 J Fin Econ at 141 (cited in note 6).

³⁰ Marcel Kahan and David Yermack, *Investment Opportunities and the Design of Debt Securities*, 14 J L, Econ, & Org 136, 137 (1998). Kahan and Yermack present evidence that investment opportunities are negatively related to the incidence of covenants and positively associated with convertibility.

³¹ Stewart C. Myers, *Determinants of Corporate Borrowing*, 5 J Fin Econ 147 (1977), describes this problem of underinvestment or debt overhang.

erations.³² Therefore, while the debt component of the security may serve to minimize the initial discount upon issue of the security, the prospect of subsequent conversion restores the ability of the entrepreneur to obtain future debt financing in good states of the world from other sources. Of course, if the venture fails, the debt claim remains and may induce liquidation and termination of the start-up firm.

III. COMPARATIVE STATICS OF VENTURE CAPITAL PARTNERSHIP AGREEMENTS

Professors Gompers and Lerner assert that cyclical changes in the demand for and supply of venture capitalists explain certain features of venture capital contracting. For example, as discussed below, they assert that increases in demand lead to some dilution of the restrictions on the activities of venture capitalists in their partnership agreements (pp 31–32, 35–37). The authors imply that investors differentiate venture capital from the rest of capital markets and that heightened demand may yield not only supernormal returns, but also contracting inefficiencies.

Gompers and Lerner observe that there are a small number of participants in venture capital finance, and that the sector is significantly segmented by the size, industry focus, location, and reputation of venture capitalists (pp 31–32). They also suggest that the number of venture capitalists and venture capital organizations changes relatively slowly. The supply of venture capital services is rigid because of the time required to acquire the skills and the track record necessary to raise new venture capital (p 4). Moreover, the secondary market in limited partnership interests is thin (p 32). Therefore, they argue that an increase in demand among investors improves the bargaining power of venture capitalists and thereby causes a significant short-run bump in their returns (p 31).

Venture capitalists receive two forms of compensation: their contractual share of portfolio profits and nonmonetary private benefits they can extract from the partnership. Gompers and Lerner hypothesize that, in light of inelastic supply, increases in demand lead to compensation increases primarily in the form of private benefits, through a dilution of the restrictions on the activities of venture capitalists (p 32). To support their claim, they empirically demonstrate a significant positive relationship between the restrictiveness of covenants on the one hand and, on the other hand, (1) capital inflows relative to the existing venture pool, (2) the proportion of investors who retain an investment manager, and (3) the total compensation of general partners (pp 45–47).

Gompers and Lerner pay insufficient attention to explaining and justifying the premises of their thesis. It may therefore be useful to speculate what the more complete story would look like. Demand among investors for venture capital may increase when exogenous changes lead investors to value more highly the type of intermediation offered by venture capitalists, or when they acquire a greater taste for the risk-return profile of venture capital investing. This function is based on an assumption about product differentiation in the market for financial securities that, in turn, depends on the substitutability among intermediaries and the completeness of capital markets. Although banks might be incapacitated from filling the role of venture capitalists, their managers may well have the experience and mobility to do so.

³² David Mayers, *Why Firms Issue Convertible Bonds: The Matching of Financial and Real Investment Options*, 47 J Fin Econ 83 (1998).

Gompers and Lerner propose, however, that the supply of venture capital is inelastic because of the substantial fixed costs of building track records and acquiring expertise. However, even if there is little substitutability across industry focus and location, there may be a considerable amount of substitution across experience. It is not clear why these are all-or-nothing attributes, rather than matters of degree. In particular, at any time, there are presumably individuals at different stages of developing track records and expertise. One might expect that investors would price different levels of experience and reputation and, in periods of heated demand, may be prepared to contract on more favorable terms with weaker candidates. Unless there are other barriers to entry, presumably the demand would lure new entrants who would command the lowest price and offer competition to the more experienced players.

Suppose, however, that increases in the inflow of capital improved the bargaining power of venture capitalists. Would they extract their rents in the form of private benefits? One would not believe so if investors are sophisticated. Rather, venture capitalists would maximize their return by agreeing to efficient restrictions on their activities and by applying their bargaining power to capture a larger share of the monetary returns.

Gompers and Lerner presume that venture capitalists may be able to exploit some lack of sophistication in their limited partners. In particular, they make two observations that are relevant to this premise. First, they say that covenants are less visible and therefore easier to change than monetary compensation, which seems to stick to an industry norm of an 80 to 20 percent division of profits (p 32). Second, covenants are likely to be less restrictive when investors are not represented by investment managers (p 46). Investment managers not only select the funds in which the investor (for example, pension fund) invests, but also often negotiate the terms and conditions of the partnership agreement. The authors imply that the supply of investment managers is also relatively rigid and, therefore, in high demand periods, investors may not use investment managers (p 35). Investors, by themselves, may not fully comprehend the risk of private benefit extraction by venture capitalists and are therefore more likely to agree to diluted covenants.

However, venture capital investors are generally institutions, which would be expected to understand agency problems and the importance of covenants. Even without advisors, they should at least have the competence to detect variations in covenant patterns. Therefore, although the stickiness of the 80-20 profit division remains puzzling, the authors' empirical findings might be alternatively explained by the fact that heightened investor demand is correlated with economic growth and relatively low risks of failure. These, in turn, suggest both that agency problems are reduced and that the value of flexibility is enhanced. Therefore, in these periods, some covenants may be efficiently diluted to broaden the discretion of venture capitalists.

CONCLUSION

Professors Gompers and Lerner have made the most extensive contributions to large-sample empirical study of venture capital financing. Yet, as they describe features of venture capital financing, a reader might doubt whether venture capitalists have innovated contracts that are significantly different from conventional securities in the old economy—particularly, bank financing. The distinctive feature of venture capital seems to be the greater use of con-

vertible securities, which the authors do not focus on. There are undoubtedly other significant contracting innovations that remain to be developed and tested, and substantial returns to be enjoyed in this respect in the next generation of venture capital security design.

In the spirit of a growing portion of financial economic scholarship, the authors believe that the rational expectations model—and, particularly, the analysis of information asymmetries—fails fully to explain contracting patterns. Thus, they place a great deal of emphasis on the possibility that the bargaining parties in noncompetitive markets may reach inefficient agreements. For reasons identified in this Review, however, they seem to fall short in making this case in the context of venture capital partnership agreements.

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