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Venture Capital Contracting in Theory and Practice

Implications for Entrepreneurship Research

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Abstract

This paper provides a comprehensive theoretical and empirical literature review of venture capital contracts. The paper outlines differences between theoretical and practical uses of contract designs, that is, (1) how does the choice of securities give rise to different adverse selection problems in terms of attracting different types of entrepreneurial companies; How does the choice of securities in conjunction with cash flow and control rights provisions affect (2) the effort levels by the entrepreneur and the investor; and (3) ultimately affect entrepreneurial outcomes. The paper highlights the major discrepancies between theory and practice and points out potential avenues for further research.

INTRODUCTION

Investments by venture capital (VC) companies in prospective and promising entrepreneurial firms give rise to pronounced principal–agent conflicts. These conflicts emanate from substantial information asymmetries as well as behavioral uncertainties related to the interaction with the investment target (e.g., Amit et al., 1998), which shape the detailed contracts used to govern the relationship over the life of the investment (e.g., Cumming & Johan, 2009). Research on VC contracting covers the investment life cycle, i.e., selection, appraisal, contracting, monitoring and exiting of target companies. This research has yielded a large body of literature addressing how contract design can cope with the unique agency-theoretic features of the relationship between VCs and their portfolio companies. However, due to the relative opaqueness of the VC industry, early research focused on self-reported surveys with inherent selection and reporting biases. Available empirical support is relatively sparse (though increasing) and highlights several discrepancies between theoretical design principles and contracting choices observed in VC practice (e.g., Kaplan & Stromberg, 2003; Kaplan & Stromberg, 2004; Cumming, 2006; Cumming & Johan, 2009).

The purpose of this paper is to comprehensively review the theoretical literature alongside the practical use of different contract design features by VCs to answer the following three questions: (1) How does the choice of securities (i.e., common equity, preferred equity, convertible preferred equity, debt, convertible debt, and mixes of these securities)[1] give rise to different adverse selection problems in terms of attracting different types of entrepreneurial companies? How does the choice of securities in conjunction with cash flow and control rights provisions (2) affect the effort levels of entrepreneur and investor and (3) ultimately shape entrepreneurial outcomes?

[1] Refer to Table 1 for definitions of these terms

With regard to the first question, VCs apply enhanced screening and monitoring skills as well as superior industry expertise to mitigate agency problems[2] in the investment relationship with entrepreneurial firms. Given that agency problems differ across entrepreneurial firms, contracting choices are expected to include an appropriately designed capital structure (i.e., selection of financing vehicle) to mitigate their perceived influence on investment performance (e.g., Jensen & Meckling, 1976). This is in line with theoretical work on capital structure and selection effects, which outlines how using different securities is linked to different types of adverse selection risk and different types of entrepreneurial firms: Equity attracts firms with low expected returns; debt financing attracts those with high variability in returns (e.g., Stiglitz & Weiss, 1981; Cumming & Johan, 2009); and convertible securities attract those with low variability in returns (e.g., Brennan & Kraus, 1987; Cumming & Johan, 2009).

A growing body of empirical research on capital structure and selection effects in the VC industry however shows mixed support for the achievements of the theoretical literature (see Table 2). One major strand shows convertible securities to be uniquely optimal for venture capital (e.g., Gompers, 1997; Gompers & Lerner, 2001). Another strand provides a diverse picture of the securities used (e.g., Cumming, 2006). The latter shows that, besides economic agency costs explanations, more theoretical and empirical work is required that is context dependent, and that explores the effect of other factors such as differences in tax regimes, institutional differences and market conditions (e.g., Gilson & Schizer, 2003; Kaplan & Stromberg, 2003; Kaplan & Stromberg, 2004; Cumming, 2006; Cumming & Johan, 2009).

Concerning the second question, moral hazard risks associated with the entrepreneur's role as a contracting agent are well outlined: (1) the entrepreneur's unwillingness to expend

[2]See Berger and Udell (1998), Bergmann and Hege (1998), Chan (1983), Casamatta (2003), Casamatta and Haritchabalet (2007), De Clercq and Sapienza (2001), Gompers and Lerner (1999), Kanniainen and Keuschnigg (2003, 2004), Manigart, Sapienza and Vermeir (1996), Manigart et al., (2000, 2002a, 2002b, 2002c), Mayer, Schoors and Yafeh (2005), Sapienza (1992), Trester (1998) and Wright and Lockett (2003).

value-maximizing effort after VC funds are committed, or (2) the potential of extracting informational rents from knowing more about her own quality/ability than the VC, or (3) having the leverage of threatening to leave when human capital is particularly valuable to the firm, or (4) being in control of the venture project with no prospect of intervention in the event of disagreement with the VC investors (e.g., Kaplan & Stromberg, 2004). Predicted theoretical remedies – using performance-sensitive compensation (e.g., Holstrom, 1979; Lazear, 1986), investor liquidation rights (Ross, 1977; Diamond, 1991), specifying contingency-based control rights (e.g., Aghion & Bolton, 1992; Dewatripont & Tirole, 1994; Dessein, 2002), and vesting rights (Hart & Moore, 1994)[3] – have only just begun to be empirically tested with hand-collected data samples and more direct proxy measures of risk (e.g., Kaplan & Stromberg, 2004). As it turns out, the theoretical predictions regarding generic moral hazard risks faced by VCs and how they are mitigated have found mixed empirical support (e.g., Kaplan & Stromberg, 2004). Empirical testing has however yielded interesting new avenues of inquiry, such as the optimality of contract implementation, the influence of institutional context, and the relative bargaining power of VC and entrepreneur in the deployment of financial instruments and supplementary contract provisions (e.g., Inderst & Muller, 2004).

Finally, the third question involving the contractual specification of exit rights for VC and the firm's founders is an important issue used to solve or at least mitigate exit-related hold-up problems. Indeed, conflicts of interest often arise when the VC decides to divest from a well-performing venture, typically either via an initial public offering (IPO) or a trade sale (acquisition). First, the entrepreneur may oppose the VC's exit decision to protect the private (control) benefits from being an owner–manager (Hellmann, 1998), which can be especially relevant in the context of a projected trade sale (Black and Gilson, 1998). Moreover, VCs usually have more interest in a sale than the entrepreneur, since the VC must return the cash

[3] Refer to Table 1 for a comprehensive outline and definitions of key types of rights

flows from disinvestment to the VC investors within a given time period (Gompers & Lerner, 1998). Neither theoretical nor empirical work seems to have fully incorporated relative bargaining power, the role of the legal regime and other context variables, all of which should enhance our understanding of observed contracting behavior (e.g., Cumming & Johan, 2009).

While other contributions, in particular Fried and Hisrich (1988), Wright and Robbie (1998), Gompers and Lerner (2001), Wright et al. (2005), and Da Rin et al. (2013), merely touch upon contracting issues in the context of more general reviews, our objective is to critically evaluate the achievements of the theoretical contracting literature in the presence of the existing empirical evidence in much greater detail and with respect to specific entrepreneurship issues.

Insert Table 1 about here

This paper proceeds as follows. First, we provide a review of each of the three main research questions as posed above, and for each question, we then juxtapose theoretical and empirical research to identify potential inconsistencies and avenues for further research. The final section concludes with a summary of our findings and provides an outlook into potential future research.

REVIEW OF VC CONTRACTING LITERATURE AND ITS LINK TO ENTREPRENEURSHIP RESEARCH

Choice of Securities and the Type of Entrepreneurial Company

In this section, we review research on the question of how the choice of financial instruments gives rise to adverse selection problems in terms of attracting different types of entrepreneurs. The extent of adverse selection problems, i.e., the degree of information asymmetry and agency costs faced by the VC firm, are not uniform across different types of entrepreneurial firms. Work on this problem follows three streams: (1) the seminal (and Nobel

prize winning) work that explains why different offers of securities attract different types of firm (or entrepreneur types) (e.g., Jensen & Meckling, 1976; Stiglitz & Weiss, 1981; DeMeza & Webb, 1987; 1992); (2) theoretical work that suggests how security design can be adjusted to appropriately mitigate agency problems; and (3) empirical studies of how contract design is applied in practice. We will first focus on the seminal and theoretical literature on securities choice and the choice of entrepreneurial firm types, followed by a review of the relevant empirical work.

Theoretical Literature on Securities Choice and Entrepreneurial Firm Types

Early work notes that entrepreneurial firms with low expected returns (identified as 'lemons' in the finance literature) are attracted to common equity because they face low opportunity costs of giving up ownership (e.g., DeMeza & Webb, 1987; 1992). At the same time, entrepreneurial firms with high variability in returns (and therefore vast potential upswings in value) face relatively high opportunity costs of giving up ownership are attracted to (non-convertible) debt and preferred equity (e.g., Stiglitz & Weiss, 1981). Convertible securities appeal to firms with low variability in returns (Brennan & Kraus, 1987). The cited studies highlight that agency problems differ across firms and imply entrepreneurial firms will prefer different contract offers depending on their different risk/return profile. In light of this observation, researchers note that securities can be designed within contracts to appropriately mitigate agency problems based on the specific characteristics of the firm seeking financing (e.g., Cumming & Johan, 2009).

Building on this early finance literature, two literature streams emerged focusing on venture capital finance in particular: the first (and quite vast) stream characterizes convertible preferred securities as the optimal form of financing for entrepreneurial firms (e.g., Chan, 1983; Amit et al., 1990; Berglöf, 1994; Bergmann & Hege, 1998; Gompers, 1997; Marx, 1998; Trester, 1998; Casamatta, 2003; Schmidt, 2003), while a second stream suggests that

convertible securities are not uniquely optimal (e.g., Barney et al., 1994; Landstrom et al., 1998; Manigart et al., 2002; Cumming, 2006; Cumming & Johan, 2009).

Early contributions favored fixed-fraction contracts. These are equity-like positions providing the VC with the same payoff proportion after each new round of investment. This contract type therefore helps to avoid potential mispricing and solve hidden information problems (e.g., Admati & Pfleiderer, 1994). Another early proposal was the implementation of debt-equity mixes that grant VCs the contractual right to intervene in order to improve the entrepreneurial firm's prospects for success, but only insofar as the previously hidden information concerning the venture's success potential becomes visible (Marx, 1998). Subsequent research analyzed securities choice in the context of a staged financing framework (e.g., Cornelli & Yosha, 2002). Similar to previous work, staged-financing models demonstrated the superiority of convertible securities over any combination of debt and equity by giving investors the opportunity to abandon the project when it is efficient to do so. It was further shown that staging can also mitigate excessive risk-taking by entrepreneurs since outside investors are provided with an option to obtain a share of the firm, thereby reducing the entrepreneur's payoff stake (e.g., Green, 1983). Staging can also help to address adverse selection and double moral hazard problems by conditioning the allocation of the cash flow and control rights on the contracting parties' effort and information revelation, thereby inducing the transacting parties to convey information truthfully and to implement efficient effort levels (e.g., Bergemann & Hege, 1998; Houben, 2002; Schmidt, 2003).

The staging literature has a number of assumptions in common, namely: (1) Asymmetric information exists solely between the entrepreneur and the outside capital market, (2) VC companies are better informed than outside investors are, (3) VC companies observe the same information as the entrepreneur and, hence, no informational asymmetries prevail at the inception stage of the project. The latter part of assumption (3) is not very likely

to hold in reality. Nearly all other papers assume information asymmetries between VC investors and founders.

Empirical Literature on Securities Choice and Entrepreneurial Firm Types

Empirical results using U.S. data leave little room for doubt that convertible preferred equity is the major financing instrument chosen by the VC industry. In fact, convertible preferred equity is employed nearly exclusively in VC investments: 100% of a sample of 1,534 investment rounds in Bengtsson and Sensoy (2011); 100% of a small sample of 27 financing rounds in Sahlman (1990); at least 80% of a survey study among eight VC firm principals by Trester (1998); and 94.5% of a study examining first-hand data from 200 investment contracts by Kaplan and Stromberg (2003) (see Table 2 below for a summary of these key papers). The cited studies are far from representative and suffer from methodological bias[4] (with the possible exception of Bengtsson & Sensoy, 2011). However, they at least deliver a broad picture of the U.S. VC market.

Given this very one-sided picture, Gilson and Schizer (2003) offer a tax-related explanation for the frequent use of convertible preferred stock that applies only to the United States. Companies issuing convertible preferred equity are able to offer favorable tax treatment on their incentive compensation payments to employees (most notably, the founder). Such employees are then able to defer income taxes until after they divest from these holdings, presumably at a time when their marginal tax rate is significantly lower. As incentive efficiency is a central aspect of venture capital finance, the authors conclude that this effect represents a central purpose for using convertible preferred equity and explains the remarkable similarity of capital structures in U.S. venture finance.

[4] For example, Trester (1998) assumes a sample of 800 total investments, evenly distributed among the surveyed VCs. Also, the response bias of survey studies is problematic—especially considering the low number of total responses.

Accordingly, the overall picture in other countries is substantially more diverse. In a number of studies outside the US, convertible securities ranked behind either straight equity, silent partnerships, or debt-equity mixes (e.g., Bascha & Walz, 2002; Hommel, et al, 2003).

Studies of investments of European VC funds (e.g., Bottazzi et al., 2004; Bottazzi et al., 2009; Cumming, 2008; Schwienbacher, 2008; Hege et al., 2009) and studies of investments in Canadian ventures (e.g., Cumming, 2005a; 2005b) find a very heterogeneous picture regarding both, the choice of financial instrument as well as the distribution of cash flow and control rights. Common stock is used more than convertible preferred equity, followed by mixed debt-equity and straight debt or straight preferred debt. Interestingly, US VCs hardly finance their Canadian portfolio firms with convertible preferred equity. This phenomenon is attributed to differences in capital gains taxation (e.g., Cumming, 2005a; 2005b). According to these studies, the securities choice explanation relates above all to the nature and extent of agency problems rather than to different financial structures being used as functional equivalents.

Insert Table 2 about here

Generally confirming the heterogeneous picture generated with international samples, Kaplan, et al. (2007) employ a very diversified international sample and find that, while the majority of their investments are in fact financed with convertible preferred equity (53.8%), this remains much less common than in the U.S., where it is applied almost exclusively. These authors identify differences attributable to legal regime, but also note that experienced VCs appear able to implement U.S.-style contracts everywhere. Their findings indicate the efficiency of U.S. contracting, as well as the presence of learning effects from growing VC experience over time.

When one considers U.S.-focused empirical studies, the predominance of convertible securities as the optimal financing instrument does not appear consistent with the postulations of early seminal work, which finds that different contract offers attract different types of entrepreneurial firms. A possible reason is that U.S.-based studies consider VCs as early-stage investors, which according to Cumming and Johan (2009) is arguably a narrow view of VC activity overall. It also masks the differences among entrepreneurial firms within the early-stage sector. Early-stage-focused VCs select companies characterized in terms of stage of development, i.e., in the seed, startup or expansion phase of development.[5] Other characterizations include experience of the entrepreneur, industry growth and the dependence on new technologies.

Which financing instrument one expects to be associated with the seed and startup stages depends on the agency costs present for that context. Cumming and Johan (2009) provide a cogent summary of the arguments (p. 305). They argue that adverse selection costs are significant for startup and expansion-stage firms due to the significant presence of systematic, unsystematic, and informational risk. In addition, moral hazard costs are high for startup firms because of the malleable nature of their assets, which provides entrepreneurs with greater discretion for extracting private benefits. Consistent with these arguments, a greater reliance on convertible preferred equity is observed.

Additionally, investing in high-technology entrepreneurial firms exposes VCs to larger agency costs than non-tech firms. Three factors account for this: First, the significant presence of intangible assets adds to the difficulty of determining firm value; second, a high degree of asset specificity impairs the collateral value of these assets and; third, the unique skill set of target company management permits the extraction of managerial rents (e.g., Hart & Moore,

[5] As opposed to later-stage investors, VCs typically invest in pre-profit or even pre-revenue development stages and accompany product conception, early production, marketing, and market expansion. For an overview and definition of different investment stages, refer to, for example, Sahlman (1990) and Gompers (1995). Cumming and Johan (2009) suggest that this is a narrow view of venture capital and propose to include buyouts and turna-rounds as well.

1994; Noe & Rebello, 1996). As such, high-tech ventures are expected to make greater use of convertible securities, while non–technology-based entrepreneurial firms are assumed to attract a greater percentage of non-convertible financing.

Empirically, the use of convertible securities is not confined to early-stage investments or high-technology firms – the findings are decidedly mixed. Some researchers have suggested that VCs may be able to implement similar cash flow rights allocations by using combinations of straight preferred and straight common stock (Kaplan and Stromberg, 2003). Several instruments or instrument combinations are perceived as substitutes in most models. Cumming (2001) identifies three major groups of functionally equivalent securities: straight debt and straight preferred equity, straight common stock and warrants, and all 'convertible-preferred-like' securities. Other research also shows that, for a given security, different uses of contract provisions (cumulative dividends, liquidation preference, etc.) can achieve a functionally similar payoff for the investor (e.g., Metric & Yasuda, 2010; Bengtsson, 2011). It is important to note in this context that debt-equity mixes are for instance functionally equivalent to convertibles in some models (Bergemann & Hege, 1998; Marx, 1998), while in others they are not (Berglof, 1994; Cornelli & Yosha, 2002; Schmidt, 2003).

As explained above, tax regime differences drive much of the adoption rate for convertible securities, in the US in particular. Cumming and Johan (2009) proffer two other explanations: (1) institutional – the adoption rate is positively influenced by investor sophistication and the familiarity with non-vanilla financing instruments; (2) variations in stock market conditions – unfavorable stock market conditions are likely to drive up the use of financing instruments with downside protection features. Additionally, there appears to be a strong carry-over learning effect with VCs likely to employ contractual terms with which they are familiar with from earlier investments (e.g., Bengtsson & Bernhardt, 2011). While the overall conclusion about the dominance of agency factors in explaining contractual

differences remains valid, mixed empirical findings provide avenues for future research to study the explanatory value of other factors.

Finally, a number of contributions examine how the relative bargaining power of entrepreneur and VC, e.g. proxied by experience, affects contracts and allocation of cash flow as well as control rights. Cumming and Johan (2008) show on the basis of their European sample that more experienced entrepreneurs are more likely to finance themselves with common equity and correspondingly less likely to employ convertible preferred equity. VCs represent the mirror image with investment experience being positively related to the use of convertible preferred equity and negatively related to the use of common equity. These results are also consistent with Kaplan et al. (2007) and Hsu (2004), who show that investor sophistication leads to more favorable deal terms, which entrepreneurs willingly grant in exchange for their affiliation with more reputed financing partners.

Moreover, Bengtsson and Sensoy (2011) find that more experienced VCs make less use of contractual clauses protecting returns on the downside. This result suggests that VCs with better governance abilities are trying to avoid clauses involving costs of risk sharing and focus more on influencing venture development, e.g. by negotiating more far-reaching board representation rights.

We will now proceed to discuss how contract design can affect entrepreneurial effort. We first provide an overview of the issues involved in contract design and entrepreneurial effort. We then discuss the theoretical and empirical literature on cash flow allocation followed by the theoretical and empirical literature on control rights.

Securities Selection, Cash Flow and Control Rights and Entrepreneurial Effort

After the investment decision, VCs incur unique risks specific to investing in entrepreneurial companies that result in further agency costs. VCs and entrepreneurs have

potentially diverging interests, stemming from imbalanced financing structures[6] and the fact that the latter associate substantial non-monetary benefits with their role in the company and with the existence of the company as a whole.[7] This can motivate the entrepreneur to make decisions against the VC's best interests and to engage in 'window dressing' activities, biasing the venture's short-term performance.

Venture capital contracts must account for this discrepancy and must adapt with regard to the parties' major goals. The entrepreneur wants the possibility of flexible future expansion and medium- to long-term control over the company to retain the above-mentioned benefits. The VC is primarily motivated monetarily, aspires to the highest possible return, and seeks contractual downside protection. Further, VCs want the option to take control of the company in case of poor performance, and full control of their own exit in case the venture develops positively. Contracts therefore must encompass a range of eventualities unique to venture financing, especially regarding the venture's various lifecycle stages and its expected degree of development over time. Efficient contract design can help to align the incentives of VCs and the entrepreneur, thereby limiting opportunistic behavior on the part of the latter and, as a consequence, value destruction of the VC's investment.

The allocation of cash flow rights between the two contracting parties is supposed to secure the VC an attractive return on investment, while still providing sufficient pecuniary incentives for optimal exertion of effort on the part of the entrepreneur.[8] This can be achieved

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[6] For example, Admati and Pfleiderer (1994) argue that the decision whether to continue the company's operations is implicitly made by the better informed entrepreneur, whose option-like payoff structure (limited loss, but high participation in potential gains) encourages him to overinvest and to continue projects that should rather be abandoned on the basis of a narrow discounted cash flow calculus.

[7] According to Bergemann and Hege (1998) this misalignment can also in turn lead to potential moral hazard problems, as the entrepreneur may divert funds and effort to serve his private benefits, still unobservable to the investor.

[8] Cash-flow–related covenants are generally intended to secure the VC's financial stakes. They are applied as a downside protection for the VC to prevent a dilution or reduction of his investment value and as a measure to maintain control over the constitution and duration of his share in the portfolio firm. To restrain their initial investment amount, VCs apply staged financing and thereby refuse to commit the entire amount all at once by making cash flows conditional on the achievement of specific milestones. To manage their financial claims after total capital infusion, conversion options regulate the conditional type of claim and, for example, enable a swap between debt and equity stakes, respectively, between a fixed high-order claim in case of distress and a partici-

with a proper mix of financing instruments, executive compensation, and cash flow contingencies in the form of milestones.

While a founder's base salary in venture capital–backed companies tends to be relatively low (e.g., Wasserman, 2006), total compensation can be significant and is very sensitive to firm performance, for instance due to the inclusion of equity options (e.g., Baker & Gompers, 1999). Pre-revenue financing rounds also make greater use of vesting provisions to ensure that the founder stays on board (e.g., Kaplan & Stromberg, 2003).

The allocation of cash flow rights is generally more important for the management of the founder's incentives than the compensation structure, mainly because of the larger impact on total wealth. It involves the mix of financing instruments supplemented with additional contract features assigning cash flow rights to the contracting parties. The distribution can be made either independent of (straight debt or equity) or dependent (convertible instruments) on project success by security choice alone. It can further be enhanced by staging capital infusions into the portfolio firm and by making them contingent on fulfillment of specified performance goals. In this way, the VC can not only abandon projects that fall short of initial expectations, but can also structure the founder's incentives of effort provision. Such goals often include financial performance targets, but may also correspond to the achievement of operational milestones such as the development of a prototype, a successful patent filing, or market entry.

Theoretical Literature on Cash Flow Rights Allocation: Staging

Theoretical models of the implied hold-up problem demonstrate how staging can improve venture performance. First, it increases the likelihood of the entrepreneur obtaining future investments. As the entrepreneur is building up firm-specific capital over time, the likelihood of his withdrawal becomes less likely (Neher, 1999). Second, staging includes a

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pating claim on high returns. Other such covenants protect minimal financial interests in cases of liquidation or distress (liquidation rights, dividend provisions).

value-enhancing real option of terminating the investment as uncertainty resolves itself (exit/put option) (Bigus, 2006). Third, staging represents a complementary mechanism to reduce agency cost (in situations where the entrepreneur's effort is unverifiable) and investment risk. It therefore ensures the funding of ventures, which would have otherwise been rejected by VCs in an all-or-nothing setting (Wang and Zhou, 2004). While all these theoretical treatments generate valuable insights on the potential benefits of dividing venture finance into a contingent sequence of smaller investments, the assumptions of these models remain questionable, especially with regard to the presence of symmetric information and the certainty about the project's outcome given continuous provision of both founder effort and VC funding (Neher, 1999).

The theoretical literature also reveals potential downsides of staging, namely that it may cause VCs to underinvest in promising projects or to abandon non-promising projects too early, implying a loss in social welfare (Wang and Zhou, 2004). In legal domains with low levels of property right protection, staging exposes the entrepreneur to a potential breach of trust with the VC threatening to transfer the venture's intellectual property to another party. This will induce the entrepreneur to reduce non-contractible effort. Wang and Zhou (2004) among others have however shown that high-powered cash flow incentives can prevent investor opportunism, which goes beyond the reduction of moral hazard discussed in earlier work.[9] In particular, binding long-term contracts can mitigate the VC hold-up problem by conditioning the investor's cash flows on the venture's financial performance over time or the fulfillment of operational milestones in the previous stage.

Empirical Literature on Cash Flow Rights Allocation: Staging

The insights provided by the theoretical literature are largely confirmed by empirical findings. Staging does lead to a discontinuation of investments after the receipt of negative

[9] In addition to the studies above, Sahlman (199) already finds staged investments, connected with the option to abandon, to primarily mitigate moral hazard by entrepreneurs.

informational updates about a portfolio firm's future development potential and profit prospects. VCs appear to also vary the intensity of monitoring with the magnitude of agency costs and therefore subject early-stage investments to more on-going scrutiny (Gompers, 1995). In addition, the state-contingency of cash flow rights generally appears to be a common feature in US venture capital contracting (Kaplan & Stromberg, 2003).

More recently, researchers have begun to address the question of how staged financing should be optimally implemented. Two studies in particular examine different scenarios in which either milestone or round financing is better suited.[10] They link staging to the perceived importance of either investor or entrepreneurial effort (Cuny & Talmor, 2005) and the reduction in contract completeness as well as the distribution of bargaining power between the contracting parties (Bienz & Hirsch, 2006). Further empirical work is needed to test the assumptions of these models, i.e., that milestone financing is more efficient if VC effort is very important, or whether VC and entrepreneurial effort are equally important in the presence of either heterogeneous expectations or a VC preference for liquidity, and how efficiency of type of funding relates to different venture types in terms of technology risk.

The relationship between staged financing and monitoring warrants further attention in empirical work as well. Tian (2011) has found based on a U.S. dataset that staging serves as a compensatory mechanisms for coping with the downsides of geographical distance between VC and portfolio firm. It would be particularly interesting to explore whether this finding can be confirmed when considering VC investments crossing national boundaries, legal regimes (case law vs. common law countries) and cultural spheres.

We will now discuss the theoretical and empirical literature on control rights and its impact on entrepreneurial effort.

[10] While VCs under milestone financing already commit to payment of additional tranches ex ante (conditional on specific performance goals), round financing implies no fixed VC commitment. Still, the entrepreneur can reasonably expect the VC to participate in subsequent financing rounds once such goals are met.

Control Rights

Through a combination of instrument choice and (control-related) covenants, VCs are able to separate the allocation of cash flow and control rights. Adhering to their role as active contributors of risk capital, VCs use (co-)decision and veto rights to influence the strategic direction of the venture (e.g., via board membership) (see Table 1 for a comprehensive outline and definitions of veto rights and board rights). They typically have the ability to enforce or block management and board decisions, even after the contract has been signed. VCs contribute their own resources and expertise to the development of the portfolio firm and pro-actively protect their stake against potentially harmful disagreements with the founder. They intensify their influence when the venture is not performing well by making the distribution of control rights contingent on measures of the venture's financial or non-financial performance.

Theoretical Literature on Control Rights Allocation

According to theoretical literature, VCs bundle a risky claim with disproportionate control rights and, in addition, include control shifting covenants in their contracts (Chan, et al, 1990) independent of cash flow rights (Kirilenko, 2001).[11] If the venture meets performance expectations, the entrepreneur remains in control and receives performance-contingent compensation.[12] Control rights matter given that contracts are incomplete and not all potential conflicts of interest can be resolved ex ante. Information asymmetries imply that a wealth-constrained entrepreneur maximizing his private benefit function may engage in opportunistic behavior, which is not aligned with the interest of a return-oriented financial investor with time-limited commitment. Control rights define a "pecking-order" of governance regimes, which can move the venture from full entrepreneur control to contingent

[11] All other papers to this point assume control to be a binary or categorical (founder, joint and VC control) variable. Kirilenko (2001) introduces the concept of continuous control (e.g., referring to voting rights).

[12] Tykvova (2007) points out that several of the authors' assumptions are rather questionable. First, the first-period cash flow should not commonly prove the entrepreneurial skills of the founder. Second, Chan et al. (1990) imply that control is costly for both parties. Most other papers assume private benefits of control for the founder instead.

control to full VC control depending on the VC's perceived need of protecting its financial interests (Dewatripont & Tirole, 1994).

VCs commonly seek comprehensive control rights beyond those implied in the financing relationship. They for instance often include the right to appoint the CEO and other members of the management board (Hellman, 1998). Entrepreneurs agree to relinquish control if it enhances the VC's effort in identifying value-enhancing professional management, for instance in response to poor founder performance. Entrepreneurs are also more willing to relinquish control the smaller their own equity stake, the tighter their own wealth constraint, and the higher the expected quality of external management. Contracts are by definition incomplete and may leave some enforceable future transaction unspecified. Attempting to predetermine which party de facto has the final say for such transactions, i.e., thinking about how to complete the contract and how to outwit the counterparty, may create costs in excess of the expected benefits (Bolton & Faure-Grimaud, 2010).

Empirical Literature on Control Rights Allocation

Empirical research investigating control rights dynamics finds that, as predicted by theory, VCs attain more control (e.g., increasing VC board involvement after a CEO replacement) in portfolio firms with low performance (Lerner, 1995). It has also been shown that VCs implement covenants to allocate control independent from cash flow rights (Gompers, 1997; Kaplan and Stromberg, 2003) and that the use of control covenants increases with agency costs. It is particularly intensive for early-stage and R&D–intensive portfolio firms (Gompers, 1997) as well as pre-revenue firms (Kaplan and Stromberg, 2003). The use of control covenants also appears sensitive to the degree of potential conflict of interest perceived in the contracting relationship (e.g., Bengtsson, 2011).

In addition, VC board involvement correlates positively with geographic proximity to the portfolio firm (Lerner, 1995; Bengtsson & Ravid, 2011). This finding challenges the

assumed dominant homogeneity of U.S.-style contract provisions and has not been fully captured by the theoretical literature as well.[13]

In the next section, we discuss the theoretical and empirical literature on how contract design can affect VC effort.

Contract Design and VC Effort

A unique feature in the VC-entrepreneur relationship results from the role of VCs as active investors, which ideally goes far beyond the traditional principal–agent context. Considering the potentially limited managerial experience of (first-time) entrepreneurs, VC effort can be essential for the achievement of investment success. More recent theoretical models consider a double moral hazard scenario,[14] in which the VC provides input in the form of monitoring (Lerner, 1995) and managerial advice (e.g., related to firm strategy, financial policy, negotiation with suppliers or customers, leveraging industry connections, establishment of organizational structures, recruitment of key personnel) (e.g., Gompers & Lerner, 1998; Hellmann & Puri, 2002). Casamatta (2003) even views the efforts of entrepreneur and VC as substitutes, albeit with varying efficiency. Assuming that both forms of effort are unobservable, this author assesses the effectiveness of different financing instruments in providing incentives via a more effective allocation of cash flow rights.[15]

Early empirical work on VC effort used measures such as the frequency of face-to-face interaction (e.g., Sapienza et al., 1996) or the actual hours expended by the VC (Gorman & Sahlman, 1989) to highlight how VCs add value to the portfolio company. These contributions do not however include the effect of VC effort exerted via financing contracts.

[13] We thank an anonymous reviewer for this reference.
[14] Cp., for example, Schmidt (2003), who precludes that VC commitment has a direct impact on the success of high-potential ventures and can also not be contractually fixed, especially because the necessary amount of effort is usually unknown ex ante. Therefore, it should be taken into account when modeling this relationship.
[15] Also, Repullo and Suarez (2004) recognize a "complementarity between the provision of financing and advice" by the VC and observe a double-sided moral hazard problem. These authors extend the model of Schmidt (2003) to also capture staged financing.

Subsequent work accounted for this aspect by including effort proxies for advice and monitoring, mostly in the form of dummy variables (e.g., Kaplan & Strömberg, 2004). Work that is more recent examines contracts in relation to actual hours of VC effort expended (e.g., Cumming & Johan, 2007). One of the key findings is that VC effort positively co-varies with the magnitude of cash flow and control rights held by the VC. Specifically, VC intervention becomes more likely as VC control increases, while the provision of value-added services and advice increases with the VCs equity stake (e.g., Kaplan & Stromberg, 2004; Cumming & Johan, 2007). The conclusions are however based on small datasets so that there is a need for further confirmatory work.[16]

We will now proceed to discuss the theoretical and empirical literature on how contract design can affect outcomes.

Contract Design and Entrepreneurial Outcomes

Hold-up problems by both VCs and entrepreneurs may arise for a number of inter-related reasons: (1) contractual incompleteness implying that important variables must be omitted from the contract because they are difficult or even impossible to describe initially; (2) differences in objectives between entrepreneur and VC; and (3) the long-term nature of the relationship. While entrepreneurs are interested in securing the benefits from venture success under a contractual regime with shared control (e.g., Fried & Ganor, 2006), VCs want to limit the entrepreneurs' ability to consume the investment in the form of private benefits (e.g., Casamatta, 2003; Kaplan & Strömberg, 2003; Schmidt, 2003).

The allocation of control rights and decision rights, in particular exit provisions (see Table 1 for an outline and definitions of exit rights), are used to resolve or at least mitigate hold-up problems related to the termination of the investment. Theoretical treatments have

[16] We thank the editor for this suggestion.

employed dimensions of security design and control rights (e.g., Aghion & Bolton, 1992; Berglöf, 1994; Bascha & Walz, 2001; Neus & Walz, 2005; Hellman, 2006) to consider the contractual implications of a successful exit, which may involve an initial public offering (IPO) or an acquisition (trade sale) (e.g., Sahlman, 1990; Gompers & Lerner, 1999). Other exit types, such as buybacks, secondary sales, or liquidations are generally not considered optimal outcomes for the VC (e.g., Cumming & Johan, 2009).

Exit-related rationalizations of security choice for instance deal with the use of convertible preferred equity, which allocates cash flow rights differently for IPOs and trade sales due to an automatic conversion clause, which typically comes alive in the case of an IPO.[17] An IPO exit normally requires the VC to maintain its equity stake until the end of the lock-up period. In this case, both parties' effort levels remain important going forward and the underlying double moral hazard problem is best resolved with pure equity. After a trade sale, however, the acquirer assumes control, so the distribution of cash flows becomes the only relevant issue. As automatic conversion provisions do not come into effect in this case, the VC maintains its senior claim for the remaining equity stake (e.g., Hellman, 2006). Empirically, preplanned acquisitions are found to be more likely to be associated with convertible securities than common equity (e.g., Cumming & Johan, 2009).

Because the entrepreneur derives private benefits from being an owner-manager (Hellmann, 1998), she may resist an exit decision in which control benefits are lost. This is likely to be the case in a trade sale (Black & Gilson, 1998). Moreover, VCs usually have more interest in a sale than the entrepreneur does, since they must return the cash flows from disinvestment to their investors (Gompers & Lerner, 1998). These differences in motives and objectives give rise to possible conflicts of interest and cause the literature to differentiate between preplanned exits and actual exits. Preplanned exits describe the VC's initial choice of

[17] Gompers (1997) analyzes only convertible preferred agreements and finds that 92% of contracts include an automatic conversion clause for initial public offerings.

exit channel, typically a trade sale or an IPO. The exit intention may not be disclosed in full to the entrepreneur or even not at all. In contrast, actual exits represent realized exit outcomes (e.g., Cumming, 2008).

VC contracts often imply a time-dependent evolution of decision and control rights. The VC relinquishes rights to interfere with operational decisions over time, but in return obtains valuable exit rights in the course of the financing relationship. This can be achieved by taking advantage of the entrepreneur's desire to benefit from the VC's expertise and network of specialist service providers at the time of exit (e.g., Gompers & Lerner, 1999; Lockett & Wright, 2001). The entrepreneur is further interested in benefiting from the VC's reputation, which can serve as a quasi-rating and thereby increase the venture's exit value (e.g., Lerner, 1994; Gompers & Lerner, 1999; Neus & Walz, 2005).

Empirical studies confirm these theoretical postulations (see also Table 2). It has for instance been shown that stronger VC control rights (such as drag-along rights, board control, and ability to replace the founding entrepreneur as CEO) increases the likelihood of a trade sale rather than an IPO or a write-off. Stronger VC rights seem to be necessary to enforce the choice of an exit channel, which is typically the less preferred alternative of the entrepreneur (Cumming, 2008; Cumming & Johan, 2008; Bienz & Walz, 2010). Moreover, VC control is found to negatively co-vary with the expected duration of the contractual relationship (Bienz & Walz, 2010). At the same time, the implicit assumption that VC exit rights are fully respected is questioned by new evidence showing that exit rights can be renegotiated when corporate law gives common shareholders more advantage and when VCs lack board control (e.g., Fried & Broughman, 2007; Broughman & Fried, 2010).

CONCLUSION AND OUTLOOK

The VC market involves early-stage (and therefore high-risk) investments and is made up of active investors. VCs have to cope with a large array of potential incentive conflicts

ranging from adverse selection and window dressing to moral hazard and hold-up by either contracting parties. While theoretical research reaches back nearly 25 years, it has long lacked satisfying empirical support. The situation has changed as the literature started to refocus from survey-based work to inquiries utilizing hand-collected datasets of contracting practices. Still, empirical research continues to struggle with the opaqueness of the VC industry and the reluctance of practitioners to share first-hand data.

The present review article draws on the findings of seminal theoretical and empirical contributions on venture capital contracting practices to arrive at a number of conclusions relevant for the shaping of future research.

First, a wide array of theoretical research on security choice contingent on the type of entrepreneurial firm suggests that VCs ought to select the financial instrument in accordance with the agency problems that the contract is designed to tackle. Adverse selection risks are for example much more pronounced for startup firms than for expansion-stage firms and more for high-tech firms than for non–high-tech firms. There however appears to be no consistent theoretical explanation for the heterogeneous mix of securities that researchers find in practice. One stream finds the almost universal use of convertible securities in the US, which is seemingly inconsistent with the hypothesis that securities are chosen based on agency cost differences[18]. Another stream finds that the situation outside the US is more varied. While the most compelling explanation for the heterogeneous mix of securities choices in VC financing contracts is based on agency cost differences (e.g., Cumming, 2006; Cumming & Johan, 2009), recent research highlights other factors such as tax differences (e.g., Gilson & Schizer, 2003), institutional sophistication, learning differences, and differences in stock market conditions (e.g., Cumming & Johan, 2009). These contributions provide fruitful direction for

[18] We thank an anonymous reviewer who has pointed out that whilst it is true that almost all US contracts use convertible preferred stock in some form, this security is merely a "shell security" that allows for large flexibility in security design. The VC could design a convertible that is essentially equivalent to common stock (full participation, low liquidation preference, no cumulative dividends) and another convertible that is equivalent to debt (no participation, high liquidation preference and cumulative dividends). Existing research shows that this contract design is strongly linked to agency costs.

future theoretical and empirical work. Most empirical papers are based on U.S. or Canadian data sets. Broadening the geographical coverage would provide an enhanced understanding of the context-dependent nature of contracting practices.

Moreover, choice of security is either independent of or goes hand-in-hand with the contractual specification of cash flow and control rights. A broad stream of theoretical research suggests that selection effects are predominantly associated with security choice at the outset, not the underlying terms of contracts that must be negotiated and fine-tuned (e.g., Stiglitz & Weiss, 1981; DeMeza & Webb, 1987; 1992). However, this research still requires empirical validation. A useful future research agenda would explore how the use of securities choice, cash flow rights (such as staging), and control rights – when employed as substitutes or complements – relates to entrepreneurial types.

Further, VCs use staging to structure the supply of funding and employ control rights (decision and veto rights) to manage the entrepreneur's incentives. Control rights are commonly contingent on financial as well as non-financial performance and help to enlarge the VC's influence in adverse conditions to mitigate agency problems emanating from ex ante contracting. VCs set strong contingent cash flow incentives through staging and performance-sensitive compensation. Theoretical research on staging nowadays focuses on the optimality of milestone versus round-based financing, which still requires empirical testing. Specifically, we still need insights on the relative importance of entrepreneurial and VC effort, the role of venture type and institutional contexts (e.g., Cuny & Talmor, 2005).

Gompers (1995) and other seminal contributions have shown that staging is especially employed to control entrepreneurial effort in industries characterized by severe agency problems (e.g., higher levels of asset intangibility, greater R&D intensity, higher market-to-book ratio). More recent empirical work tests the notion that VCs assess the costs of staging (e.g., negotiation, contracting costs, induced short-termism of entrepreneurs, and lags in project implementation) relative to the costs of monitoring the entrepreneur. As Tian (2011)

has shown with U.S. data, staging and monitoring are substitutable for short geographical distances between VC and venture headquarter but that stage financing becomes more frequent as distance increases. This practice is also strongly associated with financial performance. Future work should examine these issues in different country settings.

Control rights, such as board involvement and specified decision and veto rights, are used to incentivize the entrepreneur and to prevent undesirable behavior. Theoretical predictions on the use of control rights have moved from the allocations of formal control based on given contingencies to the consideration of actual interference (e.g., Dessein, 2005). While surrender of formal control by the entrepreneur is premised on the usefulness of signaling project quality, further empirical research is needed to examine the effect of actual interference on contracting practices. VCs use covenants to efficiently separate cash flows from control in order to reign in on the founder's private benefits of control. Although some clauses can functionally substitute certain attributes of financial instruments, they are mainly applied complementarily. For example, the finding that more experienced VCs make less use of contractual clauses to protect their returns on the downside suggests that they use their monitoring capabilities to obtain better contractual concessions elsewhere. A great deal of additional empirical research is required to study what form these concessions can take. Do they for instance bring about greater board representation or better exit provisions? Overall, the use of covenants appears to be quite prevalent internationally but more research is required in different national contexts, mainly in Europe and emerging markets.

In addition, there only exists rather scant empirical evidence on effort provision of VCs and entrepreneurs in relation to contracts. Data quality is the main hindering factor because of the difficulty of measuring effort proxies such as actual hours expended by the VC (a notable exception is Cumming & Johan, 2007). Although we know that greater VC control rights is associated with greater VC effort, both in terms of value-added services and interventions, there is ample scope for studies with better data sets and a broader array of countries.

Further, theoretical and empirical treatments of how contract design is related to exits provide a strong test of contract formation theories (Aghion & Bolton, 1992; Hellmann, 2006). These contributions demonstrate that VCs negotiate for stronger control rights in anticipation of a need of forcing the entrepreneur to acquiesce to an acquisition. Future research directions on this issue should include more theoretical and empirical work on how bargaining power and legal conditions influence contract design (security choice and control rights) with respect to exits (e.g., Cumming & Johan, 2009; Broughman & Fried, 2010). More research with finer-grained data is desirable to study the performance impact of VC preplanned exit strategies and their disclosure to the entrepreneur versus instances without disclosure (e.g., Cumming, 2008). We also still lack a good understanding whether and how portfolio size differences affect preplanned exits. Finally, more work is needed to analyze the linkage between staging, syndication of VC investments and preplanned exits (e.g., Cumming & Johan, 2009).

When considering the performance implications of contract design, past research has shown that the use of convertible preferred equity is associated with higher internal rates of returns (IRRs) as well as with smaller deviations of self-reported, non-realized IRRs of live investments from subsequently realized IRRs (e.g., Cumming & Walz, 2010).

Contractual terms, also account for differences in behavior that may influence key outcomes, such as the rate of innovation through the efforts of entrepreneurs or VCs (e.g., Metric & Yasuda, 2010), as well as indirectly through exit outcomes—a topic that requires extensive future study.

Finally, there is only very limited evidence on contracting behavior outside of the U.S. This stands in stark contrast to the growing significance of these VC markets. Data availability is certainly a problem in Europe due to a scattered cross-national marketplace, implying that the continent is severely under-researched from our perspective. Future empirical work can deliver evidence on the presence of contractual differences due to legal,

fiscal, and institutional factors. It may further be possible to document intertemporal learning with the underlying hypothesis that sectoral growth has led to a homogenization of contracting practices relative to the United States.

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Table 1

Summary of terms that appear in VC Contracts

Term	**Description**
Security	
Common Stock	share of a company's equity that gives the holder specified rights such as voting rights at the shareholder's meeting and participation of paid dividends
Preferred Stock	share of a company's equity that typically gives the holder the right of specified payments in excess of common stocks but doesn't allow him to vote on the shareholder's meetings
Convertible Preferred Stock	share of a company's equity that gives the holder the right to exchange his stocks into common stocks and is preferred in case of bankruptcy and dividend payments
Shareholder Loan	junior debt instrument of a company which is granted by its shareholders and fulfills pre-specified payments at pre-specified dates
Debt / Bond	loan to a company with pre-specified maturity which gives the holder the right of pre-specified payments at pre-specified dates and in case of bankruptcy the right to take over the company
Convertible Debt	loan to a company with pre-specified maturity and payments at pre-specified dates which gives the holder the right to convert it into a predetermined number of common stocks
Silent Partnerships	capital contribution to a company with only limited liability up to the invested capital and sometimes partner guides the management
Veto Rights	
Veto Asset Sales	veto right of the VC firm to forbid asset sales
Veto Changes to Shareholder's Agreement	veto right of the VC firm to change shareholder's agreement
Veto Sale of Shares	veto right of the VC firm to prohibit the company to sell shares in order maintain the own voting power
Veto Capital Structure	veto right of the VC firm to changes in the capital structure of a company in order to stabilize already promised covenants
Veto Profit Distribution	veto right of the VC firm to changes in the profit distribution of a company in order to maintain the specified payments and rights of the VC

	firm
Veto Company Dissolution	veto right of the VC firm to forbid the dissolution of a company when the VC firm has alternative solutions for the company
Veto Acquisition / Sales	veto right of the VC firm to forbid the acquisition or sale of subsidiaries
Veto Business Plan	veto right of the VC firm to changes in the existing business plan
Veto Head Count	veto right of the VC firm to changes in the number of employees
Control Rights	
Management Replacement Clause	clause that enables the VC firm to exchange the current management which often consists of the company founders
Voting	
Voting Rights	pre-specified voting rights in percent assigned independently of the share of equity to the different parties involved in the company; VC firm, founder, non-founder management, others
Board	
Board Rights	pre-specified rights in percent assigned to the different parties in the board; VC firm, founder, non-founder management, others
Board Seats	pre-specified number of seats assigned to the different parties in the board; VC firm, founder, non-founder management, others
Exit Rights	
IPO Participation Rights	right of the VC firm to sell parts of the allotted shares in an IPO
Registration Rights	right of a shareholder to participate in the registration of the issuer's stock for resale in the public market
Drag Along Rights	rights pursuant to which minority shareholders are required to sell their securities in connection with a sale by the majority shareholders
Lock-Up	initial shareholders not allowed to sell their shares at exit without consent of investors
Tag Along Rights	right of investors to include their minority stock in any sale of stock by majority shareholders
Right of First Refusal	right, which is granted to any shareholder, to purchase shares held by other shareholders before these shares may be sold to a third party
Preemption Rights	right of an investor to participate in a financing round in order to maintain his percentage of ownership

Redemption Rights	the right of the VC firm to sell back shares to the entrepreneur at a pre-specified price and after a pre-specified period of time
Post-IPO Lock-Up	pre-specified period of time after IPO in which investment may not be sold

Table 2

Summary of Empirical Studies on Venture Capital Contracting and Implications for Entrepreneurship Research

VC structure and entrepreneurial firm type				
Author(s)	Sample Description	Data Source	Timeline	Main Findings
Trester (1998)	8 venture capital firms each with at least $250m under management and over 100 deals and a sample of 800 financing deals	Survey	Not reported	Preferred equity dominates early-stage financing (96.4%) and debt and common equity financing used more in later-stage financing
Cumming (2005a)	12,363 Canadian and US venture capital (VC) and private equity financings of Canadian entrepreneurial firms	Macdonald and Associates (Toronto)	1991 to 2003	Study concludes that selection of security depends mainly on factors such as agency costs, tax, and market conditions, but less so on sophistication and learning factors. Moreover, unlike US-based studies, forms of preferred equity are not as frequently used
Cumming (2005b)	3,083 Canadian corporate and limited partnership venture financing transactions	Macdonald and Associates (Toronto)	1991 to 2000	Study finds that seed-stage firms are more likely to be financed with either common equity or straight preferred equity, and less likely to be financed with straight debt, convertible debt, or mixes of debt and common equity. High-tech firms more likely to be financed with convertible preferred equity.
Cummings (2006)	4,114 first round Canadian VC financing	Macdonald and Associates (Toronto); CVCA	1991 (Q1) to 2003 (Q3)	Startup-stage firms more likely to be attracted by offers of debt financing rather than common

	transactions			equity. Similarly, high-tech firms more likely to opt for debt financing rather than convertible preferred equity
Kaplan and Stromberg (2007)	145 investments in 107 companies in 23 non-US countries by 70 different lead VCs:	VC or institutional investor documents and surveys	1992 to 2001	Study finds that fewer than 54% of non-US financings employed convertible preferreds. More experienced VCs are more likely to employ US-style contracts irrespective of legal regime and obtain better results.
How VC contracting affects entrepreneur and VC effort				
Sahlman (1990)	40 stock purchasing agreements from a broad range of VC partnerships	Venture Economics and field research over eight years	1980 to 1988	VCs manage uncertainty and information asymmetry problems by staging the commitment of capital, basing compensation on value created, and preserving mechanisms to force agents to distribute capital and profits
Gompers (1997)	Random sample of 50 convertible financings by venture capital firms	Aeneas Fund at Harvard Management Company. COMPUSTAT	December 1988	VCs use convertible securities to secure their investment cash flows and to incentivize the entrepreneur. Covenants provide the VC with control rights, whose use increases with potential agency costs i.e. in early stage firms, industries with high R&D expenditures and high market-to-book ratios
Kaplan and Stromberg (2003)	213 VC investments in 119 portfolio companies by 14 VC firms	Contractual agreements, business plan and survey	1992 to 1999	VCs separately allocate cash flow rights, board rights, voting rights, liquidation rights, and other control rights to retain or relinquish control based on firm performance. 80% of the 213 investments employ

				convertible preferred equity
Kaplan and Stromberg (2004)	67 portfolio investments by 11 venture capital firms	Contractual agreements, business plan and survey	1992 to 1999	Study finds higher risk is associated with more VC control and more contingent compensation. VCs are more likely to intervene as VC control increases. VC value-added services increase with VC equity but not related to VC control.
Cumming and Johan (2007)	121 investment rounds in 74 entrepreneurial firms from 14 VC funds in 7 continental European countries	Mail survey and follow-up interview of VC fund members of the European Venture Capital Association		Study finds that preferred equity holders, higher perceived risk, and early-stage firms are associated with better advice. There is no link between contract design and conflict effort, but legality reduces conflict.
Schwienbacher (2008)	600 VCs in 6 European countries and 600 VCs in the US	Survey	2001	European VCs are three times less likely than their US counterparts to use convertible securities and have longer round times, suggesting their less active involvement in their portfolio companies
Bengtsson and Sensoy (2011)	646 private-partnership VCs in 1,266 start-up companies over 1,534 investment rounds	Private Equity consulting firm VC experts	2004 and 2007	Study finds that more experienced VCs would rather more frequently join boards of their portfolio companies and pay less attention to downside-protecting contractual cash flow rights than would less experienced VCs
How VC contracting affects entrepreneurial firm outcomes				
Cumming (2008)	223 VC IPO-acquisition transactions of 35 European VC funds spanning 11	Survey and interview method plus study and analysis of actual contracts	1995 and 2005	VC use of common equity associated with weak control rights in contrast to preferred securities. Ex ante stronger VC control

	European countries			rights increase the likelihood that an entrepreneurial firm will exit by acquisition, rather than through a write-off or an IPO.
Cumming & Johan (2008)	223 entrepreneurial investee firms financed by 35 venture capital funds in 11 continental European countries	Surveys and interviews with VC fund managers and review of actual contracts	1995–2002	Study finds that preplanned acquisition exits are associated with stronger investor veto and control rights, when convertible securities are more likely to be used than common equity; opposite is observed for preplanned IPOs.
Hege, Palomino & Schwienbacher (2009)	146 European seed and early stage companies and a random sample of 233 similar US companies	Venture Economics, European Venture Capital Association, World Bank, Dealogic, Lexus-Nexis, National Stock Exchanges	1997 to 2003	US VC strongly outperform European peers because of greater efficient use of instruments of control and contingent funding but no evidence to show differences in context such as tax environment, or legal origin matter
Bienz & Walz (2010)	Random Sample of 464 contracts from 290 different portfolio firms and 91 VC firms from Germany	KfW Bankengruppe (formerly Kreditanstalt fur Wiederaufbau) in Frankfurt, Germany	1990 to 2004	Study finds that trade sale rights matter more than IPO rights, specifically drag-along and tag-along rights predominantly allocated to VCs. Use of these rights linked to indications of hold-up problems in case of exit.
Broughman & Fried (2010)	Hand-collected data set of 50 VC-backed Silicon Valley high-tech firms	VentureReporter.net and survey	2003 to 2004	Of the 50 VCs exiting as preferred shareholders, 39 VCs receive their full cash flow rights, 11 VCs carve out 11% of their cash flow rights to common shareholders—a situation whose likelihood increases when common shareholders have more power vis-a-vis VCs.