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Mitigating agency risk between investors and ventures' managers

By

Cristiano Bellavitis

Auckland University

Auckland, 1010

New Zealand

&

Dzidziso Samuel Kamuriwo

Cass Business School, City, University of London

106 Bunhill Row, EC1y 8TZ, London

d.s.kamuriwo@city.ac.uk

&

Ulrich Hommel

EBS Business School

**Gustav-Stresemann-Ring 3
65189 Wiesbaden, Germany**

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Abstract

The general management literature has long focused on the agency risks involved in the relationship between general managers and shareholders. Shareholders can deploy contractual and non-contractual mechanisms to reduce these inefficiencies. This study examines - based on a broad international sample of investment contracts - how the use of contractual and non-contractual mechanisms is related to the degree of risks associated with the venture's development stage as well as how these practices differ across countries. Hypotheses are tested using a proprietary dataset of 265 hand-collected investment contracts associated with ventures in the U.S., Israel and nine European countries. Findings suggest that the use of mitigating contractual and non-contractual mechanisms is related to the degree of agency risks, and that these practices vary across countries. This study draws implications for how investors can best deploy their capital in different institutional settings whilst nurturing their relationships with managers and entrepreneurs.

Keywords: agency theory, agency risks, moral hazard, adverse selection, investment contracts.

1. Introduction

The debate over whether managers' actions are consonant with the interests of shareholders has a long history in the general management literature (Oviatt, 1988). The relationship between agents (i.e. managers-entrepreneurs) and principals (i.e. shareholders-investors) has been the focus of a large stream of the general management literature (e.g. Martin, Wiseman, and Gomez-Mejia, 2016). Management scholars have demonstrated that the relationship between agents and principals is endangered by agency risks, i.e. the likelihood of the emergence of contractual inefficiencies. These risks generally arise in the form of adverse selection and moral hazard and are exacerbated by technological shifts, fast-moving industries and new ventures (Abdallah, Darayseh, and Waples, 2013; Burchardt, et al., 2016). In order to mitigate them, principals have different mechanisms available: (1) pre-investment screening and due diligence that allows investors to select the best managers and ventures (Manigart et al., 2006); (2) contracts that align the incentives of the managers with those of the investors, and at the same time reduce downside losses (Kaplan and Strömberg, 2003); (3) post-investment monitoring and control rights that allow shareholders to steer the company strategy in the right direction and regain control if necessary (Hellman and Puri, 2002; Martin et al., 2016).

Although the general management literature has come a long way since the seminal articles of Jensen and Meckling (1976) and Williamson (1985), evidence on the effectiveness of contractual and non-contractual mechanisms in controlling agency risks “has been mixed at best” (Martin et al., 2016: 1). Despite extensive progress, the current general management literature offers some interesting research gaps. First, past work on this subject has been descriptive (e.g. Admati and Pfleiderer, 1994; Kaplan and Strömberg, 2003, 2004; Burchardt et al., 2016), has

considered the mechanisms in isolation (e.g. Hellmann and Puri, 2002; Martin et al., 2016), or has focused on mature-listed companies (e.g. Tosi, Katz, and Gomez-Mejia, 1997). Second, we still lack insight on *when* contractual and non-contractual mechanisms are utilized to manage the relationship agent-principal in unlisted companies. Third, despite the increasingly globalized nature of the economic environment, there is limited research on how institutions affect relationships between managers-entrepreneurs and shareholders-investors across national boundaries.

The aim of this paper is to fill these three gaps in the following way. First, this paper investigates *when* - i.e. under which conditions - contractual (e.g. cash flow rights) and non-contractual (e.g. monitoring) mechanisms are implemented by shareholders-investors (principals) in unlisted companies which are still in the early stage of their development (typically labelled as seed, start-up and expansion phases). Second, the richness of the contractual data allows the consideration of the interaction of several mechanisms in the mitigation of agency risk, which is particularly prevalent in new ventures. Third, this study is one of the first to investigate how the institutional context is affecting the adoption of such mechanisms. The paper tests its hypotheses on a unique dataset of hand-collected confidential investment contracts involving firms in the U.S., various countries in Europe and Israel. This proprietary dataset includes 265 investments of venture capital (VC) firms in 127 ventures. The industry context is appropriate for this study due to its fast-moving nature, high uncertainty and severe agency risks (Wright and Lockett, 2003).

This paper contributes to the general management literature by enhancing our understanding of how principals (shareholders-investors) can better manage their relationship with agents (managers-entrepreneurs) and reduce potential agency conflicts. Considering how difficult it is for investors in these contexts to assess the quality of a company ex-ante and measure the agent

(manager-entrepreneur) effort ex-post, it is important to explore how investment risks can be reduced with contractual and non-contractual mechanisms. The findings have naturally broader relevance for the classic shareholder-manager relationship that is notoriously endangered by agency risks (Eisenhardt, 1989; Fama and Jensen, 1983). The study argues theoretically, and demonstrates empirically, that investments are designed to consider the riskiness of the ventures and the agency risks involved in the relationship between managers-entrepreneurs and investors-shareholders. It further demonstrates that investing practices, contractual and non-contractual, differ depending on the level and type of agency risk associated with the investment, and depending on the institutional context.

The remainder of the paper is structured as follows. In the next section, we derive a set of hypotheses characterizing the relation between principals (investors-shareholders) and agents (managers-entrepreneurs). This is followed by an overview of the data used to test the hypotheses, a description of the empirical methodology and a discussion of the main results. The final section concludes and outlines future research opportunities as well as managerial implications.

2. Theory and hypotheses

Agency risks endanger financing relationships where there is a principal (investor-shareholder) and an agent (manager-entrepreneur). These risks are particularly relevant in the funding of new ventures. The interaction between founders-managers and shareholders-investors gives rise to principal-agent conflicts because of high investment uncertainty, information asymmetry, and behavioral incentive problems. Investors (as principals) invest capital into high-risk ventures managed by entrepreneurs (the agents) that possess considerably more information

about their venture. This leads to agency risks resulting from adverse selection and moral hazard. To protect their investment returns, principals need to reduce agency risks.

Adverse selection arises from the principal's difficulty to evaluate the quality of the investment (which includes the agent's abilities). In certain cases, products may experience an initial traction that then fades quickly. In other cases, ventures aim to develop new technologies that are difficult to assess, and whose market is unidentified. In general, the earlier the stage of a company development, the harder it is to evaluate the quality of the venture. Investors mitigate these problems by conducting detailed due diligence and ensuring that they hire executives with ample industry experience. Pre-investment screening can be strengthened with syndication (i.e. involving more investors expands the resources and skills available to evaluate a venture) and by looking at signals emanating from the target such as the founders' acceptance of certain contractual clauses (e.g. Lerner, 1994). Relevant signals convey the entrepreneurs' confidence of the quality of their venture or business plan (Amit, et al., 1990; Tykvova, 2007).

Investors are also at risk of managers-entrepreneurs' moral hazard. Even when investors choose good projects, the manager and entrepreneur might still behave opportunistically and diminish the value of the investors' payout (e.g. using company resources for his/her own benefits). Investors can mitigate the moral hazard problem in several ways by, for example, negotiating control rights such as board rights and management replacement rights through which they can check the venture's progress and the founder's behavior. However, some features of the entrepreneur's business will remain unobservable or unverifiable. Agency risks can be reduced by negotiating cash flow rights such as preferred equity, redemptions rights, tag along clauses as well as staged financing. Cash flow rights can impose severe penalties on the entrepreneur for opportunistic behavior and guarantee investors a better protection in case of

bankruptcy. The entrepreneur's acceptance of these clauses is, per se, a strong signal of confidence and acts as deterrent for opportunism.

Figure 1 summarizes the theoretical model. Early-stage ventures are mostly endangered by adverse selection risks, which implies a greater reliance on cash flow rights. In contrast, later-stage ventures are more likely to suffer from moral hazard risks, to be addressed with a broader use of control rights. Further, institutional logics play an important role in the use of these mechanisms. The expectation is that more developed funding markets such as the U.S. will implement more screening, monitoring and cash flow rights, but fewer control rights. In the next sections, these mechanisms are explained in detail.

----- Insert Figure 1 about here -----

2.1 Ventures' agency risks

Some investments carry more agency risks than others. In the VC industry, adverse selection is usually associated with the level of development of the venture. Early-stage ventures are more uncertain and, consequently, carry substantial adverse selection risks. As Podolny (2001) writes, entrepreneurial firms that have not yet developed a viable product are regarded as being in the first (early) stage. Second-stage financing takes place after a company has initiated production but typically before the company has become profitable. Finally, when the company enters the third (late) stage it usually has already built up a substantial revenue stream and might start to show positive profitability. As the company progresses through the various stages, adverse selection risks and information asymmetries surrounding the firm can be expected to diminish.

On the contrary, the potential for moral hazard increases with venture development. The potential misallocation of effort by the founder, who has an incentive to accumulate private

benefits at the expense of investors, is likely to increase as the venture develops and the founder's equity share shrinks. Venture growth is accompanied by entrepreneurs having more resources under their control (but with a smaller share of total equity) and increasing confidence (as they obtain superior information on the firm's substance and prospects). Moral hazard risks also stem from potentially diverging interests that worsen over time between investors and entrepreneurs. Entrepreneurs will, for instance, increasingly associate non-monetary benefits with their role in the company (Bergemann and Hege, 1998).

In sum, early-stage ventures are exposed to higher adverse selection risks and lower moral hazard risks. On the other hand, moral hazard is more prominent in later-stage ventures. Venture capitalists have several contractual and non-contractual levers to maximize their returns and manage their risks when they invest in ventures at different stages.

2.2 Syndication as a screening and monitoring mechanism

Syndication refers to equity investments by multiple investors under conditions of uncertainty that will result in joint-payoffs. It is a pre-investment screening and post-investment monitoring mechanism (e.g. Lerner, 1994; Manigart et al., 2006). Having multiple syndicate partners involved, allows for better due diligence and monitoring because of cumulated resources and skills (Kaplan and Strömberg, 2004; Sah and Stiglitz, 1986).

However, syndication is not without cost. First, co-investors not only share the burden of due diligence, but they also share the potential rewards. By co-investing, each VC obtains a lower amount of equity (and risk) and therefore a smaller portion of the potential exit proceeds. Second, previous research has highlighted that syndicates face risks of opportunism and conflicts between co-investors (Bellavitis et al., 2017b). As Filatotchev, Wright and Arberk (2006) explain, syndicate members may behave opportunistically with each other, leading to the so

called “principal-principal” agency risk. Therefore, syndication needs to be implemented conservatively.

Considering the benefits and costs, syndication is more likely to be implemented in early-stage ventures. Syndication is particularly useful for reducing information asymmetries and facilitating a more thorough due diligence during the early stages of the venture development cycle. In this phase, company-specific risks and information asymmetries are high. Combining the expertise of multiple investors can help disentangle risks and prospects of ventures, and thereby improve the chances of investment success (Lerner, 1994). The value of additional opinions increases in parallel with the perceived degree of information asymmetries and adverse selection (Cumming, 2006). Further, the moral hazard risks of later-stage ventures, coupled with the risks embedded in the principal-principal relationship, may reinforce each other. These negative effects might be exacerbated by increased monetary stakes associated with later-stage ventures. It is therefore in the early stages of a venture’s development that syndication as a screening and monitoring mechanism can outweigh its costs. The first hypothesis follows.

***Hypothesis 1:** A higher degree of syndication is more likely to be associated with early-stage ventures.*

2.3 Financial contracts and staged financing as signals

The second way for investors to reduce investment and agency risks is to design incentive-optimal investment contracts. Numerous management studies have shown that contracts shape the principal-agent relationship (e.g. Tosi et al., 1997). In the VC industry, the most commonly used contractually negotiated financial rights are preferred equity, redemption rights, tag-along rights and staged financing. These rights grant investors the possibility to protect their investments at the expense of the entrepreneur. For example, preferred equity is a

higher-ranking financing instrument that raises the de-facto seniority of the investors' equity (above the entrepreneur's common equity) by securing increased dividends and liquidation rights in the event of poor performance or bankruptcy. An additional but related mechanism is staged financing, which involves the contingent release of investment funds depending on whether certain milestones are being met by the company. Several authors have studied the role of staged financing in reducing uncertainty (e.g. Wang and Zhou, 2004).

Negotiating cash flow rights and staged financing into investment contracts provides three main advantages to funding providers. First, the yielding of cash flow rights to investors is a signal of quality, which help to deal with adverse selection and information asymmetries. When entrepreneurs are willing to accept an incentive structure that punishes poor performance, they signal confidence in their ability and their business plan (Hall and Woodward, 2010). Similarly, if the entrepreneur-manager accepts a financing structure split into different tranches, he/she signals confidence of achieving contractual milestones. Second, cash flow rights and staged financing reduce potential losses that an investor can incur, especially in risky early-stage ventures. For example, in the case of liquidation, investors holding preferred equity (rather than common equity) are likely to recoup a larger part of their investment.

However, like in any negotiation, investors need to "pay" these cash flow rights, e.g. by accepting a higher initial valuation, by giving up alternative rights, or by simply straining the relationship with the founder with uncertain later penalties. The investors' chances for venture success decrease when entrepreneurs feel that they are treated unfairly implying that leniency in contractual bargaining can help to avoid conflicts down the line (Busenitz, et al., 2004). Therefore, these mechanisms should only be demanded when they are at their most useful and the protection is most needed.

Cash flow rights and staged financing are particularly useful during the early stages of a venture's development cycle. In this phase, company-specific risks and information asymmetries are high; therefore, investors need to rely on signals to evaluate the company prospects and on contractual hedges to limit their financial risk. Early-stage ventures face a higher risk of failure and so the protection benefits warranted by cash flow rights might offer investors an important layer of protection in case of liquidation. It is in the early stages of company development that cash flow rights and staged financing are most useful. Therefore, we expect broader use of cash flow rights and staged financing in the early stage, and a more conservative use in the later stage.

***Hypothesis 2a:** A higher degree of cash flow rights is more likely to be associated with early-stage ventures.*

***Hypothesis 2b:** Staged financing is more likely to be associated with early-stage ventures.*

2.4 Control rights as a monitoring mechanism

Investors can also reduce agency risks, especially moral hazard, by demanding board control and management replacement rights. They provide the ability of influencing the company's strategic direction and, in extreme cases, entitle the investors to replace the founder/CEO (Hellman and Puri, 2002). Control rights help to enforce cooperative behavior by the entrepreneur. In case of poor venture performance, board control would gradually shift towards investors (Kaplan and Strömberg, 2003) and management would eventually be fully replaced (Hellman and Puri, 2002).

Negotiating board majority and management replacement rights into investment contracts provides investors with two main advantages. First, the founder's willingness to give up control through board majority is again a signal of quality and represents a commitment to non-

opportunistic behavior. Second, investors gain the right to intervene in case the start-up's prospects or the relationship with the founder deteriorates unexpectedly. As before, negotiating board majority and management replacement rights can strain the relationship with the founder and may be perceived as a lack of trust and a challenge of the founder's integrity and competence. This can have a detrimental effect on future interactions between the contracting parties, with consequent lower chances of venture's success, and should therefore be used cautiously.

Board majority and management replacement rights are more appropriate for later-stage ventures. The divergence of interests between entrepreneur and investors increases with the maturity of the venture, which invites moral hazard behavior and not just because of the dilution of the entrepreneur's equity-holding. While early-stage funding decisions are strongly influenced by the founders' qualities and acumen, the prospects of later-stage firms are becoming increasingly detached from their founders. The next two hypotheses follow.

***Hypothesis 3a:** Board majority is more likely to be associated with later-stage ventures.*

***Hypothesis 3b:** A management replacement clause is more likely to be associated with later-stage ventures.*

2.5 Agency reduction mechanisms in different institutional settings

Whilst agency risks account for why certain characteristics of transacting parties can be related to specific mitigating mechanisms, they do not account for institutional differences in terms of (a) perceived agency risks and (b) contractual practices. Institutional differences arise from institutional arrangements that include rules, regulations, norms, values, and taken-for-granted assumptions about what constitutes appropriate behavior (Scott, 2007). VC institutions around the world significantly differ in their level of maturity. The VC industry started in the

U.S. and then gradually expanded to Europe, Israel and, more recently, developing countries such as China. The level of sophistication of the VC industry depends on the learning stage of each country (e.g. Cumming, 2008).

The U.S. VC industry is considered the most mature and most sophisticated. It is where the professionalization of the VC industry started, setting up the norms and nuances defining the behavior of VC managers and firms. These practices later diffused to the rest of the world, starting with Europe (e.g. Bruton et al., 2005, 2009). Hence, going by a temporal assessment of the VC industry's development, the U.S. VC industry is the most developed and sophisticated in the management of their investments including the use mechanisms such as syndication, cash flow rights and staged financing.

***Hypothesis 4a:** Syndication, cash flow rights and staged financing are more likely to be implemented by U.S. investors.*

Sophistication is not the only difference between the U.S. VC market and the rest of the world. It is well known that the attitude towards failure is considerably more lenient and forgiving in the U.S. than in other countries (e.g. Europe). Burchell and Hughes (2006), surveying individuals from 19 countries (including the U.S. and numerous European countries), found that U.S. individuals are the most tolerant towards failure. This feature is a cornerstone of the entrepreneurial successes in Silicon Valley, and the U.S. entrepreneurial ecosystem at large (Cardon and McGrath, 1999; Sarasvathy et al., 2013; Shepherd, 2003). Hence, it is expected that U.S. investors negotiate a lower amount of control rights and management replacement rights, compared to their non-U.S. peers.

***Hypothesis 4b:** Control rights and management replacement rights are less likely to be negotiated by U.S. investors.*

3. Methods

3.1 Dataset and data collection

Our dataset consists of hand-collected details on international VC financing contracts for a sample of 265 investments in 127 portfolio companies by 90 different lead VCs in the United States, Germany, the United Kingdom, Israel, France, Scandinavia and other European countries. The analyzed investments took place between 1997 and 2008. To collect the data, several VC partnerships have been approached through a snowball sampling and asked to provide their original investment contracts. “The [snowball sampling] method is well suited [...] when the focus of study is on a sensitive issue, possibly concerning a relatively private matter” (Biernacki and Waldorf, 1981: 141). In the VC industry, investment contracts are highly sensitive and confidential, and personal introductions are of the essence. Snowball sampling was the most appropriate method to access investment documents. Non-random sampling has been implemented in similar studies (Ljungqvist and Richardson, 2003; Wry, Lounsbury and Jennings, 2014). Accounting for the industry’s high confidentiality standards, all contracts were accessed in the VCs’ headquarters, and all data was encoded anonymously. The sample included both small and large VCs and those with a national and/or international investment focus. To ensure the representativeness of the sample, a comparison study with other published articles has been conducted (see Appendix for more details).

Overall, the dataset has several advantages over most others used in previous studies in the field. First, data collection by hand eliminates the typical biases of survey research, implying high data quality and more factual detail. Second, the information accessed in the described form is extraordinarily comprehensive and goes beyond what was generally analyzed in previous VC

studies.¹ Third, this study is the first to access this kind of in-depth information across some of the largest VC markets in world. Primary data collection is, however, not without limitations and these will be discussed in detail in the limitations section.

3.2 Measures

3.2.1 Independent variables

Agency risks. Podolny (2001) suggests that the degree of agency risks is a function of the venture's development stage at the time of the investment. He argues that adverse selection is most prevalent in early-stage ventures, and moral hazard is most severe in later-stage ventures. Two dummy variables are included in the analyses to capture this effect: One for early-stage ventures, and one for later-stage ventures, keeping the intermediate stage as the base model.

Institutional setting. To test hypotheses 4a and 4b, two dummy variables related to the country where the investment is carried out are included: *U.S.* and *Israel*. Therefore, the base model captures investments in Europe.

3.2.2 Control variables

Considering the relatively low number of total observations, we applied a conservative approach for the inclusion of control variables to avoid model overestimation. Four control variables are included in the analyses.² First, it would be problematic to include dummy variables for each year; therefore, models include a *Dotcom bubble* measure that takes the value of 1 when the

¹ The scope of the examined documents exceeds that of most other studies. For example, Cumming (2008) limit his analyses to investment agreements, while Lerner and Schoar (2005) analyze only investment agreements, investment memoranda and business plans. This data is most similar in scope to work by Kaplan and Střromberg (2003) and Kaplan et al. (2007).

² We tested a fifth control variable (*Round number*, a count of how many VC investment rounds the entrepreneurial firm received before the focal one), but are not reporting the results because of collinearity issues. The inclusion of this variable does not change the results.

investment was carried out during the peak of the internet bubble (1999-2000). The analysis controls for investment size (in '000) as a motive for syndication (*Investment per VC*) and for the equity stake controlled by the investor (*VC stake*). Finally, investments in biotech or medical ventures might require different investment practices compared to, for example, software firms. Hence, an industry *Life science* dummy variable is included.

3.2.3 Dependent variables

Each hypothesis involves a different outcome variable. As pointed out by Tosi et al. (1997), it is important to consider agency reduction mechanisms in conjunction as investors will consider their use jointly rather than in isolation. Therefore, dependent variables change throughout the different models and, when the dependent variables rotate, they are used as control variables.

Syndication. This variable captures the degree of syndication. It is a count variable denoting the number of VC investors involved in the deal.

Cash flow rights. *Cash flow rights* is a count measure that considers how many cash flow rights are incorporated into an investment contract. Three types of cash flow rights are considered: Preferred equity, redemption rights and tag along rights. This measure can take values from 0 to 3 depending on how many types of cash flow rights are granted to the investors.

Staged financing. The measure is coded 1 when the investment is staged (i.e. when the investors disburse their funds in stages according to predetermined milestones) and 0 when the funding is provided as one bullet transfer.

Control rights. Two main mechanisms are included: *Board majority* and *Management replacement* rights. The former measure captures whether VCs control the majority of board voting rights, which enables them to enforce certain actions by the entrepreneur or to influence

important operational and strategic decisions. This variable takes the value of 1 in case VCs have board majority, 0 otherwise. The *management replacement* measure equals 1 if an explicit management replacement clause in favor of the investor is included in the contract, and 0 otherwise. With this clause, VCs have the option of replacing venture management with directors of their choice. This clause can be triggered upon certain conditions being met, usually associated with poor firm performance.

3.3 Statistical models

The analysis utilizes five different dependent variables and, in each case, the estimation technique is tailored around the choice of variable. Models 1 and 2 use a Poisson regression (see Coleman, 1964: 378–379) to test Hypotheses 1 and 2a. As reported by Stata, “a Poisson regression fits models of the number of occurrences (counts)”, and is therefore appropriate for the variable of *syndication* (count of VCs involved, model 1) and *cash flow rights* (count of cash flow rights, model 2). Models 3 through 5 use a Logistic (logit) regression (see Aldrich and Nelson, 1984) to test Hypotheses 2b, 3a, 3b, 4a, and 4b. As reported by Stata, “Logit fits maximum likelihood models with dichotomous dependent variables coded as 0/1”. The dependent variables *staged financing*, *board rights majority* and *management replacement* are dummy variables (coded as 0/1). In all regressions, standard errors are clustered at the individual VC firm level, which allows us to consider the potential of within-group correlation of errors (VC firm).

3.4 Results

Table 1 reports the basic descriptive statistics and correlations for both, the dependent and independent variables. Around 38% of the ventures are in early stage, 20% in later-stage, with the remainder in intermediate stage. Approximately 24% of the ventures are U.S. based and

24% operate in the life science industry. The average investment per VC is \$2.2M for a post-investment equity stake of 59.3% controlled by 3.7 investors. 9% of the investment contracts incorporate an explicit management replacement clause and around 58% of investments are managed through a board rights majority. Staged financing is also widespread, with 48% of the investments being disbursed over time.

----- Insert Table 1 about here -----

Correlations show early stage investments are usually in the life science industry during the dotcom bubble. Interestingly, the dotcom bubble variable is negatively correlated with four out of five mechanisms showing that, during this period, VCs were less demanding. In terms of geographical distribution, Israel and the U.S. are negatively correlated with early-stage investments, but positively correlated with later-stage investments. Also, the dummy variable U.S. is positively correlated with the VC stake as well as with the use of various mechanisms such as syndication or cash flow rights, but negatively correlated with management replacement clauses. Variance inflation factors (VIFs) are all within the acceptable range and significantly below the critical level of 10. Hence, the findings are robust to multicollinearity concerns.

Table 2 presents the regression results, which represent a detailed assessment of the contractual and non-contractual mechanisms that VC firms use in major VC markets. Regression estimates show how the utilization of these mechanisms varies with the development stage and the location of the venture. As discussed, the dependent variable (DV) is different for every model.

----- Insert Table 2 about here -----

Model 1 tests hypothesis 1 and therefore the dependent variable is *syndication* - the number of VCs involved in the deal. Hypothesis 1 proposes that in the early stages of the

venture's development, there will be a broader use of syndication than in intermediate or later stages. Results show that there is no significant difference between early and intermediate (base model) stages in terms of the degree of syndication. However, VC firms investing in later-stage ventures rely significantly less on syndication. Hence, there is support for hypothesis 1.

Model 2 tests hypothesis 2a, and consequently the dependent variable is the number of cash flow rights in favor of the VC investors. It is hypothesized that in the early stages of the venture's development, VCs will negotiate more cash flow rights than in the later or intermediate stages. Empirics confirm this. Hence, results lend support to hypothesis 2a.

Model 3 tests hypothesis 2b, and therefore the dependent variable is *staged financing*. It is hypothesized that in the early stages of the venture's development, there will be broader use of staged financing than in the later stages. Contrary to expectations, VCs adopt staged financing significantly less often in the early stages than in the subsequent stages (intermediate and later stages). This finding might be explained by the fact that in the early stages it is more difficult to specify precise milestones upon which to link additional financing. Hence, results do not lend support to hypothesis 2b.

Model 4 tests hypothesis 3a, and therefore the dependent variable is *board rights majority*. It is hypothesized that in the early stages of the venture's development, VCs will negotiate less voting rights than in the later stages. In line with expectations, VCs obtain the majority of board rights significantly more often in later stages than in the early stages ($p < .1$). Hence, hypothesis 3a is supported.

Model 5 tests hypothesis 3b, and therefore the dependent variable is *management replacement*. It is hypothesized that there will be rarer use of management replacement clauses in

the early stages of a venture's development than in the later stages. Results are not statistically significant.

To test hypotheses 4a and 4b, location dummies (i.e. *U.S.* and *Israel*) are added. It was expected that U.S. investors use syndication, cash flow rights and staged financing more broadly than non-U.S. investors (i.e. European and Israeli), but utilize majority board voting rights and management replacement clauses less frequently. Results show broad support for both hypotheses. U.S. VCs syndicate their deals significantly more than their European and Israeli counterparts (model 1). Results also show that U.S. (and Israeli) VCs obtain more cash flow rights than European VCs (model 2). However, analyses do not show any statistically significant differences across countries with regards to staged financing (model 3). In relation to hypothesis 4b, in line with our predictions, U.S. VC investors obtain the majority of board rights (model 4) and management replacement clauses (model 5) less often when compared to European and Israeli VCs. Hence, results lend broad support to hypotheses 4a and 4b.

4. Discussion

This paper sheds light on how principals (investors), through contractual and non-contractual mechanisms, mitigate investment risks, especially the ones related to agency risks. Investors face difficulties related to understanding the venture's quality (i.e. adverse selection) and managing the managers-founders' effort (i.e. moral hazard). In this paper, the extent of principal-agent conflict embedded in the investors-entrepreneurs relationship is modelled as a function of the degree of information asymmetry and incentive problems faced by investors at each investment stage. As suggested by Podolny (2001), the earlier the investment stage, the higher the adverse selection, information asymmetries, and failure risks faced by the investors. The later the investment stage, the stronger the agent's incentive to behave opportunistically.

By associating the risks embedded in each investment to contractual and non-contractual practices, our research sheds light on the potential mechanisms that govern investment practices. The paper investigates under which conditions, namely different venture development stages and different agency risks, contractual (cash flow rights, board rights, staged financing, management replacement rights) and non-contractual mechanisms (syndication) are implemented by financial investors. It is argued that these mechanisms are costly and need to be chosen parsimoniously (Manigart et al., 2006). Investors are better off negotiating these mechanisms when they are most beneficial, depending on the type and degree of agency risks surrounding their investment.

In line with the theoretical predictions, results show that VCs investing in firms with higher agency risks broadly implement contractual and non-contractual mechanisms to better select their investee companies, monitor them post-investment, and protect themselves in case of poor performance and opportunistic behavior by the venture's management. In early-stage firms (as opposed to later stage firms) where adverse selection and failure risks are higher, results show a widespread use of syndication as a screening and monitoring tool and of cash flow rights (e.g. preferred equity) as a signaling and protection mechanism. On the other hand, in later stage firms where moral hazard risks are higher, investors negotiate more control rights (e.g. board majority rights) as a monitoring and influence mechanism.

This paper also examined the prevalence of cash flow rights such as preferred equity, redemption rights and tag-along clauses as both signaling and protection mechanisms. Findings are in line with previous studies (e.g. Trester, 1998) that showed that cash flow rights are a mechanism to mitigate adverse selection (through signals) broadly associated with the perceived degree of venture selection risk (Gompers, 1995). This important finding confirms that investors mitigate risks by calling on the entrepreneurs' willingness to accept an incentive structure that

financially punishes them in the event of poor performance. This is a strong signal of the quality of the venture itself (Hall and Woodward, 2010). Cash flow rights also offer protection against financial losses and are used to mitigate the investment risks of early stage ventures.

Interestingly, contrary to expectations, investors in early-stage ventures are less likely to employ staged financing. This finding can be explained by the fact that during the early stages of venture development, it is difficult to set precise milestones for subsequent fund releases. VCs usually invest in an idea and a founder. Future work could explore this phenomenon in greater detail.

In addition, the paper sheds light on how investment practices differ across countries. This research compares U.S. investors with their international competitors. On the one hand, results show that the superior level of sophistication of U.S. investors encourages them to syndicate more often, and contractually negotiate more cash flow rights. On the other hand, it shows that U.S. investors are less likely to negotiate control mechanisms such as board rights and management replacement clauses. These results might be driven by a more failure-forgiving culture. This logic is consistent with the existing literature arguing that acceptance of failure is a key driver of entrepreneurship (e.g. Cardon and McGrath, 1999) and that U.S. investors place a comparatively stronger emphasis on the founders' qualities (Kaplan, Sensoy and Stromberg, 2009). These results answer calls for research to study agency risks in international settings (Bellavitis, Filatotchev, Kamuriwo, and Vanacker, 2017a)

5. Limitations and future research

This paper has several limitations that present opportunities for future research. First, although the dataset is unique and offers a rich set of information, it presents its own challenges. The main limitation is the snowball sampling technique, which could have led to biases. The

authors meticulously tried to receive responses from a wide number of investors, and the variety of the respondents and investment rounds is testimony to this. However, results need to be taken with care considering that the sample might not be fully representative of the global VC industry. Unfortunately, this is a limitation shared by most qualitative databases (e.g. Bellavitis, Kamuriwo and Hommel, forthcoming). Further, receiving legal documents from extremely secretive parties such as VCs is very difficult. The authors feel fortunate regarding the number of responses received and the depth of case-level data extracted from the documents. It comes with the downside that the number of observations is limited. Future work should therefore test the hypotheses with different data sources and larger samples.

Further, this paper analyzes the principal-agent relationship associated with investors and managers-entrepreneurs. It would be interesting to see whether these findings extend to other contexts such as bankers and borrowers. Finally, forthcoming work could investigate whether similar dynamics apply to other types of relationships relevant to general management researchers. For example, do these findings extend to managers of large corporations? Does it make sense for shareholders to include certain contractual rights (e.g. replacement rights) into CEO contracts? Do institutional logics play a role, for example in emerging markets? These are just a few examples of follow-up work that could be inspired by this paper.

6. Managerial implications

The results presented in this paper offer significant managerial implications that go beyond the funding of new ventures by financial investors. Similar dynamics could be extended, for example, to shareholders and general managers of newly listed companies. Both investors and managers should understand the information asymmetries involved in their relationship. Managers need to be aware that principals face obstacles in evaluating their effort. Along these

lines, they need to accept that principals might implement mechanisms such as monitoring or demand contractual rights. Principals need to be aware that managers are emotionally attached to their company and that intense negotiations might be detrimental for the principal-agent relationship, especially in institutional settings that are not supportive of those mechanisms. During the negotiation phase, principals need to consider the potential benefits and costs associated with mechanisms that aim to reduce agency risks involved in the relationship between agents and principals. These mechanisms can be valuable, but are not without costs. For example, attaching too many financial benefits to performance-related bonuses might lead managers to feel that shareholders do not trust them and incentivize managers to act with a short-term perspective.

7. Conclusions

The general management literature has long identified agency risks involved in the relationship between general managers and shareholders. We investigate contractual and non-contractual mechanisms that VC shareholders can utilize to reduce these conflicts. The main insight from this study is that mitigating mechanisms such as syndication, cash flow rights and contractual rights offer both advantages and disadvantages. We show that shareholders-investors should carefully manage their relationship with managers depending on the venture age as well as institutional dynamics.

Appendix – Data collection strategy

Due to the sensitive nature of the VC industry, only very few researchers have so far been able to analyze contracting practices with hand-collected cross-country samples (for notable exceptions see Cumming, 2008; and Cumming and Johan, 2008) or with a dataset of similar richness (Bienz and Walz, 2010; Kaplan and Stromberg, 2003; Kaplan and Stromberg, 2004; Kaplan, Martel and Stromberg, 2007; Lerner and Schoar, 2005). Despite the dataset's advantages discussed in the main text, it may raise concerns of generalizability, which can be addressed by comparing the sample with those used in similar studies. In relation to the ventures' development, this sample is similar to Podolny (2001) and Bellavitis, Filatotchev and Kamuriwo (2014). Early-stage represents 38% of the sample, comparable to 55% for Podolny and 42% for Bellavitis et al. The intermediate stage covers 42% of the sample, while it represents 35% of the sample in Podolny (2001) and 29% in Bellavitis et al. (2014). Finally, the later-stage represents 18% of the sample, compared to 10% and 22% for Podolny and Bellavitis et al. respectively. Similar proportions can be retrieved from Manigart et al. (2006) where the authors show a sample equally split between early-stage and late-stage VC investments (the authors report only two stages).

The degree of syndication is also aligned with other studies. Sorenson and Stuart (2001) find that the average syndicate is composed of 3.5 investors, while Bellavitis et al. (2014) report 3.1 for the average syndicate. The average in this paper is 3.7.

The data covers a wide range of countries and industries. Within Europe, Germany has the highest number of investments (81), followed by the UK (34), Scandinavia (30), and France (19). The remaining investments belong to other countries such as the Netherlands, Belgium, Switzerland and Austria. Another 65 investments are from the U.S. (24.5% of the total) and 24 (9.1%) are from Israel. Contracts are from a range of different industries and are distributed

evenly over time. Major industries such as IT/software, semiconductors and communication are grouped under ‘ICT’ (70.2%), while biotech and medical technology are grouped under life science (24.9%). The remaining 4.9% comprises of firms operating in other industries, such as media, food and beverage or traditional industries.

Manigart et al. (2006) and Sapienza, Manigart and Vermeir (1996) are among the few studies looking at VC country differences. Table 3 compares the various samples. This study covers more countries than Manigart et al. (2006) and Sapienza et al. (1996). For purposes of comparison, the table reports the proportion of observations including only the countries available in the other two studies (e.g. Israel is excluded from the count). The first figure relative to this sample proportion reports the share of observations comparable to Manigart et al. (2006), while the second figure is comparable to Sapienza et al. (1996). While the values show that our sample covers well the geographical VC market distribution, the German market is over-represented in relative terms (at the expense of smaller markets such as the Netherlands and Belgium). Compared to Sapienza et al. (1996), our dataset includes a larger and more representative proportion of U.S. deals. Finally, this sample is well distributed in terms of years of investment. These differences are marginal and should not significantly endanger the generalizability of the results.

----- Insert Table 3 about here -----

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Tables and figures

Table 1 - Descriptive statistics and correlations

	Variables	Obs.	Mean (S.D.)	1	2	3	4	5	6	7	8	9	10	11	12
1	Early stage (adverse selection)	262	.38 (.48)												
2	Later stage (moral hazard)	262	.20 (.40)	-.40*											
3	US	265	.24 (.43)	-.05*	.05*										
4	Israel	265	.09 (.28)	-.11*	.01	-.18*									
5	Investment per VC	219	2208 (2199)	.03	-.02	.02	.05*								
6	VC stake	251	59.3 (24.4)	-.17*	.11*	.21*	-.11*	-.04							
7	Life Sciences	265	.24 (.43)	.26*	-.23*	-.21*	-.03	.22*	-.01						
8	DotCom bubble	265	.22 (.41)	.17*	-.18*	-.06*	-.05*	.18*	-.33*	-.08*					
9	Syndication	265	3.73 (3.12)	.05*	-.14*	.33*	-.04	.06*	.44*	.06*	-.10*				
10	Cash flow rights	256	.60 (23)	-.07*	.10*	.22*	.07*	-.02	.32*	-.11*	-.27*	.22*			
11	Staged financing	265	.48 (.50)	-.22*	.08*	.03	.01	-.01	.20*	.02	-.09*	.04	.45*		
12	Board rights majority	237	.58 (.49)	-.11*	.18*	.02	-.07	-.06*	.62*	.04	-.29*	.30*	.19*	.16*	
13	Management replacement	250	.09 (.29)	-.04	-.10*	-.13*	.13*	.00	-.04*	-.03	.11*	.01	-.14*	.01	-.16*

* p < .05.

Table 2 - Contractual and non-contractual mechanisms in VC investment contracts

Model-Estimator	1-Poisson	2-Poisson	3-Logit	4-Logit	5-Logit
Dependent variable	Syndication	Cash flow rights	Staged financing	Board rights majority	Management replace
IV: Agency risks					
Early stage (adverse selection)	-.07 (.10)	.13* (.06)	-.97** (.32)	-.13 (.46)	-.48 (.60)
Later stage (moral hazard)	-.31** (.09)	.05 (.06)	-.02 (.42)	1.06 ⁺ (.64)	-.60 (.75)
IV: Institutional variables					
U.S.	.55** (.13)	.28** (.08)	-.31 (.40)	-1.44 ⁺ (.82)	-2.19** (.81)
Israel	.06 (.14)	.18** (.07)	.34 (.48)	.15 (.67)	.42 (.95)
Investment per VC	.00 (.00)	.00 (.00)	-.00 (.00)	-.00 (.00)	-.00 (.00)
VC stake	.01* (.00)	.00 ⁺ (.00)	.02** (.00)	.08** (.01)	.02 ⁺ (.01)
Life sciences	.26* (.11)	-.12 (.11)	.38 (.45)	-.25 (.54)	-.38 (.72)
DotCom bubble	.22* (.10)	-.27* (.12)	.56 (.47)	-.73 (.59)	.59 (.54)
DV: Agency reduction Mechanisms					
Syndication	DV	.02* (.01)	-.01 (.04)	.15 (.10)	.08 (.11)
Cash flow rights	.12 ⁺ (.07)	DV	.11 (.20)	-.64* (.32)	-.41 (.26)
Staged financing	-.03 (.07)	.04 (.06)	DV	.45 (.37)	-.12 (.45)
Board rights majority	.28 (.18)	-.17 ⁺ (.09)	.35 (.34)	DV	-1.72* (.74)
Management replacement	.16 (.18)	-.13 (.10)	-.30 (.45)	-1.91* (.69)	DV
Constant	.09 (.19)	.40** (.12)	-1.07 (.89)	3.15** (.82)	-2.00* (.88)
Pseudo/R2	-	-	.10	.44	.13
Log pseudolikelihood	-416.2	-278.6	-123.4	-74.16	-54.3
VIF	3.14	2.81	3.33	2.76	3.42
Wald chi2/F	429.24**	117.39**	74.38**	178.59**	202.48**
Observations	199	199	199	199	199

** p<.01; * p<.05; + p<.1

Table 3. Observations by country and sample comparison

Countries/samples	Obs.	Our sample %	Manigart et al. (2006)	Sapienza et al. (1996)
Belgium	1	1% and N.A.	4 %	N. A.
France	19	12% and 15%	25%	19%
Germany	81	49% and N.A.	30%	N. A.
Sweden	20	12% and N.A.	8%	N. A.
Netherlands	5	3% and 4%	7%	17%
United Kingdom	37	23% and 29%	26%	34%
United States	65	N.A. 52%	N. A.	30%
Other countries	37	N. A.	N. A.	N. A.

Figure 1. Theoretical model



