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The relationship between governance structure and risk management approaches in Japanese venture capital firms

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Abstract

This paper attempts to understand what drives Japanese venture capital (JVC) fund managers to select either active managerial monitoring or portfolio diversification to manage their firms' investment risks [J. Bus. Venturing 4 (1989) 231]. Unlike U.S. venture capitalists that use active managerial monitoring to gain private information in order to maximize returns [J. Finance 50 (1995) 301], JVCs have traditionally used portfolio diversification to attenuate investment risks [Hamada, Y., 2001. Nihon no Bencha Kyapitaru no Genkyo (Current State of Japanese Venture Capital), Nihon Bencha Gakkai VC Seminar, May 7]. We found that performance pay is positively related to active monitoring and that management ownership is positively related to active monitoring and negatively related to portfolio diversification. The managerial implication of our study is that venture capitalists should be as concerned about the structure of their incentive systems for their fund managers as they are for their investee-firm entrepreneurs. Agency theory says that contingent compensation is a self-governing mechanism for individual effort that is difficult to measure and verify. When properly applied, equity ownership and performance-based pay can have powerful influencing effects on the strategic choices of managers.

Keywords: Risk management approach; Venture capital; Portfolio diversification

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1. Executive summary

This paper looks at the agency contract that exists between venture capital (VC) firms and their managers. We model the factors that drive Japanese venture capital (JVC) fund managers to select either direct managerial monitoring or portfolio diversification to manage their firms' investment risks (Gorman and Sahlman, 1989). Unlike U.S. venture capitalists that use direct monitoring to gain private information in order to maximize returns, JVCs have traditionally used portfolio diversification to manage investment risks. However, in recent years JVCs have used a mix of different strategies, including direct managerial monitoring. This change in industry practice provides an opportunity to test the applicability of agency theory in the JVC industry.

We theorize that the corporate affiliation of a JVC, compensation structure for its investment managers, and managerial stock ownership will predict whether an active (hands-on monitoring) or passive (portfolio diversification) risk management approach is chosen by the JVC fund manager. We did not find any relationship between the corporate affiliation and risk management approach. However, we found that compensation schemes and management ownership strongly affect a JVC's choice of risk management approach. Specifically, we found that performance pay is positively related to direct monitoring and that management ownership is positively related to direct monitoring and is negatively related to portfolio diversification.

The central roles played by compensation schemes and management ownership are congruent with the extant literature in agency theory. In fact, the results suggest that standard agency theoretic formulations may be generalized to the special case of Japanese venture capitalists, even though they are structured quite differently from their U.S. counterparts. Our results also suggest that direct monitoring is a multidimensional activity composed of direct intervention, as well as boardroom governance, as both were highly correlated to the latent governance construct. In this respect, JVCs seem to behave much like their U.S. counterparts.

The managerial implication of our study is that venture capitalists should be as concerned about the structure of their incentive systems for their fund managers as they are for their investee-firm entrepreneurs. Agency theory says that contingent compensation is a self-governing mechanism for individual effort that is difficult to measure and verify. However, such schemes must be sensitive to the organizational context in which they are applied. Our study shows that when the organizational culture puts a premium on distributive justice, as with many large Japanese corporations, some forms of contingent compensation such as equity ownership may not be easy to implement. On the other hand, when properly applied, equity ownership and performance-based pay can have powerful influencing effects on the strategic choices of managers.

That said, we cannot ignore the fact that the ultimate objective of VC investing by large Japanese corporations, indeed even the venturing arm of many U.S. corporations such as Intel, is not always the maximization of investment returns, but other strategic objectives such as the access to leading edge technologies or future business opportunities related to the parent's core businesses. In addition, because a large corporation has to deal with a diverse set

of internal and external stakeholders, its venture unit's focus on value maximization could be diluted. For example, the timing to harvest an investment will depend on whether the parent corporation is looking for technological spillovers (late harvest) or maximizing the efficiency of its cash flows (early harvest). Trying to simultaneously discharge these objectives will probably result in the under-performance of the venturing unit. The upshot is that if large corporations want their venturing units to maximize returns on investments, they are probably better off spinning them off as independent units, with returns driving performance incentives, measures, and even equity ownership structures.

2. Introduction

What is the impact of the structure and governance mechanisms of a VC firm on its risk management approaches? To answer this question, we build an agency model of the relationship between the JVC firm and the managers who make these choices (Robbie et al., 1997; Gompers and Lerner, 1999; Baker and Gompers, 1999).

JVCs, unlike their U.S. counterparts that use active monitoring to attenuate portfolio risks (Lerner, 1995), have traditionally used a passive approach—portfolio diversification (Hamada, 2001). However, the recent increased use of active monitoring by JVCs has allowed us to compare the factors that drive the choice of these risk management approaches (Gorman and Sahlman, 1989; Gompers and Lerner, 2001a). Briefly, our model relates the corporate affiliation of a JVC, compensation structure for its investment managers, and VC firm managerial stock ownership to the choice of active (hands-on monitoring) or passive (portfolio diversification) risk management approach. To examine this model, the paper proceeds as follows. First, we review the JVC industry, followed by the theoretical model. Then, we discuss the methods and results, concluding with some observations on the implications of our findings and directions for future research.

3. The VC industry in Japan

The Japanese VC industry is structurally different from the U.S. VC industry and thus allows us to test the generalizability of commonly used theoretic approaches. Because the institutional environments in the U.S. and Japan differed significantly, their VC industries developed in different directions. First, because JVCs could not legally be structured as limited liability partnerships (a common practice in the U.S. and Britain), many were established as stock company subsidiaries or affiliates of larger securities companies, banks, and other financial institutions. Among the largest 100 JVCs, for example, over 70% are subsidiaries of financial institutions or other large companies (*Nikkei Financial Journal*, July 7, 2000). The largest of these is JAFCO, the VC partnership between Nomura Securities, Sanwa Bank, and Nippon Life that grew from US\$1.5 billion in 1999 to US\$1.8 billion by March 2001 in total investments. The investment managers of these JVCs are usually employees with financial expertise rather than professional VC experience that have been transferred from their parent companies (see

Muraguchi's commentary on this in [Harmon, 2000](#)). Such managers are more familiar with large-firm investing than VC-equity financing techniques.

Prior to 1999, there were no dedicated exit markets such as the NASDAQ for VC in Japan. Because of this, JVCs, unlike their U.S. counterparts, confined their investing to established small and medium-size enterprises (SMEs). This was mostly to avoid the high IPO costs usually associated with early-stage companies trying to list on the main board ([Hata and Higashide, 2000](#)). Because these established SMEs did not require extensive handholding and expert advice, they were also not actively monitored by their venture funds ([Hamada, 1998](#)).² Finally, because most Japanese SMEs were financed by bank debt they did not require the type of risk capital provided by VCs, so there were few investment opportunities for VC firms ([Hata and Higashide, 2000](#); [Prowse, 1996](#)). In sum, these institutional constraints may have shaped the JVC's choice of risk management approach and thus its relationships with investee firms.

The institutional environment for JVC shifted in 1999. First, the Market of the High-Growth and Emerging Stocks (MOTHERS) was established on the Tokyo Stock Exchange in 1999, and the Japan NASDAQ was born in 2000.³ These exchanges lowered the listing requirements for new stocks, which attracted more venture capitalists that now perceived an exit path for their investments ([Hata and Higashide, 2000](#)). Second, the influx of capital fueling the Internet stock boom in the United States between 1998 and 2000 led to the entry of many VC companies established by the former investment managers of large established JVCs and foreign VC funds.

The newly established independent JVCs, together with the traditional large financial and nonfinancial institution affiliated JVCs afford us the opportunity to take up the challenge posed by [Elango et al. \(1995\)](#) and [Sweeting and Wong \(1997\)](#) in which they argued that the heterogeneity of VCs calls for further refinement and testing of the extant theory.

4. Theory and hypotheses

A typical study in VC research examines the conflict between the VC with claims over the residual cash flow rights of a venture firm and the entrepreneur who controls those rights ([Jensen and Meckling, 1976](#); [Kaplan and Stromberg, 2002](#); [Sapienza et al., 1996](#); [Admati and Pfleiderer, 1994](#)). Here, the VC protects its claim through such devices as investment staging ([Bergemann and Hege, 1998](#); [Gompers, 1995](#)), active direct monitoring in the boardroom

² Usually, such active managerial monitoring approaches are used by U.S. VCs to increase the IPO value of the VC-backed firm by infusing managerial discipline and network contacts that may be missing from early-stage ventures ([Gorman and Sahlman, 1989](#); [Admati and Pfleiderer, 1994](#)). Thus, the exit value of the firm may be as dependent on the level of managerial support and social capital provided by the VC as it is on the firm's managerial competence, technology, and capital market conditions ([Gorman and Sahlman, 1989](#); [Manigart et al., 1994](#); [Lerner, 1995](#)).

³ The Japan-NASDAQ is now operated as Hercules within the Osaka Securities Exchange, after the exit of NASDAQ in late 2002.

(Lerner, 1995; Baker and Gompers, 2000), operational control (Gorman and Sahlman, 1989; Baker and Gompers, 2000), and even shareholder agreements that confer ultimate authority to replace the CEO (Sahlman, 1990; Baker and Gompers, 2000).⁴

In this paper, we extend the literature by focusing on the relatively unexplored relationship between the VC firm and its risk management choices (Robbie et al., 1997; Sapienza and Gupta, 1994). While standard financial portfolio theory says that VCs should be indifferent to the unsystematic risks in a diversified portfolio, Manigart et al. (2002) and others have argued that VCs do not behave like ordinary investors. For example, Wright and Robbie (1998) argue that portfolio specialization (by industry, technology, or stage of growth) attenuates a VC's ability to fully diversify its unsystematic risks, forcing it to rely instead on the active monitoring of its investee firms.⁵

A public market for equity would normally attenuate agency problems because the value of managerial effort is revealed in the price of the stock, which forms the basis for a discipline mechanism.⁶ In a private equity market such as VC, where the value of entrepreneurial effort is more difficult to price, VCs rely on active or “hands-on” monitoring to obtain private information (Sweeting and Wong, 1997; Fiet, 1995; Gompers and Lerner, 2001b). The private equity market is well developed and thus there are more active flows of nonprice information in the United States than in other markets so such strategies are productive. The private equity market is relatively new and thus less developed in Japan. Therefore, such measures are more costly as they require greater attention on the part of the JVC fund manager. Therefore, these managers may also choose to reduce the costs of active monitoring through portfolio diversification, i.e., the passive or “hands-off” approach (Sweeting and Wong, 1997).

Thus, JVC managers face two choices on how they will manage the investment risks of their portfolio. However, information-processing theory suggests that a JVC will be less able to manage a more diversified portfolio of stocks if it chooses an active investment strategy. We recognize that active monitoring and portfolio diversification need not be mutually

⁴ Cable and Shane (1997) argue that a classic agent–principal approach is inappropriate because ownership and control are not completely separate in VC-backed entrepreneurial firms. Instead, they proposed a prisoner's dilemma (bilateral bargaining) model of the VC–entrepreneur relationship (p. 168). We note that their argument does not address the theoretical implications of the separation of cash flow and control rights, which Jensen (1993) considers as the necessary and sufficient condition for the existence of an agency problem. The ownership of cash flow rights by an agent is not sufficient to eliminate the agency problem—one reason why stock options do not work very well! Rather, it is the *gap* between cash flow and control rights that matters. Therefore, an entrepreneur who has 51% cash flow rights but 100% control rights will still act as a self-maximizing agent at the expense of the VC, for whom the value of the cash flow rights depends 100% on the entrepreneur's effort. A better analytical framework is the incomplete contracts (i.e., agency theory) formulation, which allows for the *partial* ownership of cash flow rights with full control rights by the agent (Grossman and Hart, 1986; Hart and Moore, 1990).

⁵ Manigart et al. (2002) and others have noted that postinvestment monitoring creates value in ways other than reducing managerial expropriation, such as in helping to identify additional business opportunities, in their portfolio firms. In this paper, we do not attempt to separate the *sources* of value creation as this is not the focus of the study nor does its consideration change the underlying theoretical model. In short, postinvestment monitoring incurs a nontrivial cost with the potential for positive net present value creation, regardless of its sources.

⁶ We realize that this would not solve *all* agency problems, as information asymmetry still exists although to a smaller degree.

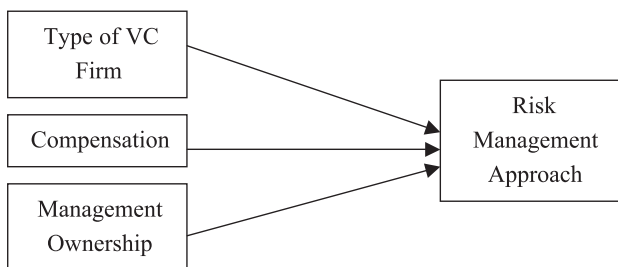


Fig. 1. The agency relationships between VC firms and VC managers.

exclusive choices.⁷ In fact, a risk neutral JVC *firm* can diversify by holding a basket of funds (i.e., a portfolio of investment portfolios) each of which is actively monitored by a VC manager. However, given scarce resources, a risk adverse JVC *manager* must consider the trade-offs between the active and passive risk management strategies. Because the costs of monitoring and enforcement are nontrivial, a JVC manager has to specialize on a few investments to maximize the future value of the investment portfolio (Gupta and Sapienza, 1992; Gompers and Lerner, 2001b). However, because the stability of future cash flows from employment depends on the returns from his investments, this risk-adverse JVC manager would have a greater incentive to diversify the portfolio (Sweeting and Wong, 1997; Kaplan and Stromberg, 2002). Therefore, in our model, the JVC managers will only choose the active direct monitoring if they are given the incentives to do so.

In Fig. 1, we depict the relationship between a JVC firm’s status (independent or corporate affiliate), JVC fund managers’ compensation and degree of equity ownership in the JVC firm, and the JVC manager’s choice in risk management strategy, defined narrowly as active monitoring or portfolio diversification. Based on empirical observation and theory we assume that JVCs that are affiliated with large financial institutions will face fewer pressures to maximize returns on investments, given the traditional emphasis on stakeholder value maximization and social stability (Sullivan, 1992).

4.1. Corporate affiliation

The traditional corporate structure in Japan is a *keiretsu* organized around main banks (e.g., Mitsubishi) or industrial firms (e.g., Matsushita). These *keiretsu* or main bank investors hold a large portion of shares in Japanese firms.⁸ Such shareholdings do not represent true investments, but rather are relationship guarantees (Hudley and Jacobson, 1998; Nakatani, 1984). This is particularly true when subsidiary firms are created to promote the interests of the parent, such as the case with corporate affiliated VC firms. For example, a financial institution may book a high-risk real estate loan with a VC subsidiary to protect its balance sheet from future losses. It may further generate loan businesses from the firms into which it

⁷ We thank a reviewer for raising this important point.

⁸ According to a study by NLI Research Institute, such “stable” shareholdings accounted for 38% of the total value of Japanese stocks in 1999, compared to 48% in 1992.

has made VC investments. Finally, it may underwrite the same firms during their initial public offerings (Prowse, 1996; Gompers and Lerner, 1999). In these examples, profit maximization of the venture is secondary to the business interests of the parent corporation (Manigart et al., 2002), which may be to reduce operational risk, stabilize trading relationships, or enhance revenue growth. Consequently, VC fund managers working for such companies may not feel the same pressures as their independent counterparts to maximize return on investments by carefully managing their investment risk though the active monitoring of investee firms. Thus, they may choose the lower yielding but more predictable passive risk management strategy of portfolio diversification.

On the other hand, nonaffiliated or independent JVC firms act more like their U.S. counterparts and thus are likely to focus on maximizing returns on investments. This increases the pressure on fund managers to look for riskier but higher yielding investment strategies (Wright and Robbie, 1998; Robbie et al., 1997; MacMillan et al., 1988). These strategies will likely involve focusing on particular industries or venture stage (seed, first or second financing round, pre-IPO, etc.), which requires JVC managers to expend effort in direct monitoring and providing managerial support and functional expertise to portfolio firms (Gupta and Sapienza, 1992). Therefore, everything else being equal, the organizational affiliation of a JVC manager will have a systematic impact on their choice of risk management approach such that:

H1a: Affiliated JVC fund status is negatively related to active managerial monitoring.

H1b: Affiliated JVC fund status is positively related to portfolio diversification strategies.

Since the variable “affiliate” was set up as binary, the implied alternative hypotheses to H1a and H1b would refer to the relationships between independent status and risk management approaches.⁹

4.2. Compensation

Contingent compensation is designed to elicit agent behaviors that are consistent with the objectives of the principal (Jensen and Meckling, 1976; Ivancevich, 2001; Baker and Gompers, 1999). Therefore, a JVC firm that compensates its managers on the basis of investment returns will prefer active direct monitoring as a risk management approach.

Venture capitalists create value by bringing managerial and operational expertise to the investee firm. This allows a VC to reap higher returns from the overall portfolio by positively altering the risk–return yield curve, relative to an uncorrelated portfolio of assets. However,

⁹ Thus,

H1a0: Nonaffiliated JVC fund status is positively related to active managerial monitoring

whereas

H1b0: Nonaffiliated JVC fund status is negatively related to portfolio diversification strategies.

classic span-of-control limitations (Gittell, 2001) ensure that for the VC managers to be effective, they can only oversee a few firms in related industries (Gorman and Sahlman, 1989).

For the individual VC manager, such specialization increases the risk of loss to his or her human capital, as it is not diversified (Sapienza and Gupta, 1994). However, this risk can be indemnified¹⁰ so that the VC managers can still expect their human capital to have positive NPV. Therefore, JVC managers who are compensated on venture performance will likely choose the hands-on monitoring approach to maximize the performance of the VC firm, which in turn will maximize the return on their human capital investments in the firm.

There is no incentive for JVC managers to invest in direct monitoring, as this represents an irrecoverable commitment to the VC firm, if they are not compensated for the risks of doing so and if the return on their investment is not higher than an alternative investment in shirking. Instead, they will choose a safer risk management approach, which is portfolio diversification, and invest their attention somewhere else, i.e., consume on the job.

In general, corporate affiliated JVCs tend to follow the compensation practices of their parent corporations. In Japan, this still means that employee seniority forms the basis for determining pay scales. For example, *Venture Club* (October 2001) reports that most fund managers are not compensated on portfolio performance (e.g., capital gains from the successful IPO of investee firms), but rather on seniority. Therefore, everything else being equal,

H2a: JVC use of performance-based compensation for fund managers is positively related to active monitoring strategies.

H2b: JVC use of performance-based compensation for fund managers is negatively related to portfolio diversification strategies.

4.3. Managerial ownership

It has been argued that managers are more likely to maximize shareholder wealth when they also own equity in the firm (Jensen and Meckling, 1976; Hill and Snell, 1989; McConnell and Servaes, 1990). Similarly, VC senior managers who own equity in their own firms would behave in a manner that maximizes the efficiency of their firm's investments. This argument is especially relevant for JVCs because they are usually structured as stock companies owned by other firms, financial institutions, and/or the senior managers of VC firms. Without equity ownership, the effectiveness of managers' monitoring activities has a smaller impact on their personal wealth (Jensen, 1984). Therefore, agency theory would predict that these managers would be less motivated to monitor their investee firms, suggesting that the owner-managers of VC firms are more motivated to use active monitoring of their investee firms.

In many ways, equity-based and performance-based compensation have the same effect as aligning the interests of the managers with those of the firm in which they have equity (Jensen, 1984). If fund managers hold part of the equity of the JVC, then their total compensation is also driven by the performance of the JVC.¹¹ The difference is that equity-

¹⁰ Examples include base salaries, lower hurdle triggers for payouts, golden parachutes, etc.

¹¹ We thank an anonymous reviewer for pointing this out.

based compensation is typically long term (managers are not free to buy and sell stock in the firm without some constraints such as vesting periods, hurdle rates, etc.), whereas performance-based compensation, in the form of cash bonuses, are paid immediately. Some forms of equity compensation also require a personal commitment of cash from the managers so that they have a vested interest in the firm. The rewards from equity ownership come as a result of the achievement of the strategic goals of the firm. Equity ownership is designed to foster an ex ante long-term view. On the other hand, performance-based compensation is ex post and is designed to encourage the achievement of a defined set of operating goals. In sum, equity ownership and performance-based pay attempt to achieve an alignment of interests but operate in qualitatively different ways.

Some have argued that owner–managers may favor portfolio diversification because their personal wealth is tied up in the firms they manage (Fama and Jensen, 1983; Amihud and Lev, 1981; Jensen, 1984). However, the VC literature is clear in its assertion that owner–managers of VC firms, acting as entrepreneurs, are more interested in maximizing the upside potential of their investments since their tolerance for risk, stemming from specialized knowledge, is higher (Fiet, 1995; Sapienza and Gupta, 1994). Therefore,

H3a: JVC equity ownership by fund managers is positively related to active monitoring strategies.

H3b: JVC equity ownership by fund managers is negatively related to portfolio diversification strategies.

5. Data and variables

5.1. Sample

The unit of analysis is the JVC firm. Data on JVCs were collected through structured interviews, conducted between December 2000 and February 2001, of JVC managers. Additional secondary data were collected from published sources listed below. The firms were chosen from the largest 106 JVCs listed in the *Nikkei Kinyu Shimbun* (*Nikkei Financial Journal*, July 2000). Because large JVCs dominate the industry in Japan—the top 10 JVCs accounted for over 60% of total VC investments in 2000 whereas the top 30 accounted for 90% of the total (Hamada, 2001)—we believe the selection bias, if any, was minimal.

From this list, we first categorized VC firms by their affiliations such as securities, company-affiliated, bank-affiliated, insurance company-affiliated, nonfinancial-firm-affiliated, and independent based on the ownership structure. Then we contacted the top 5 to 15 VC firms in each category or about 70 VC firms in total for interviews, collecting data from 40 firms (about 57% response rate), representing about 40% of the top 106 largest JVCs. Thirty-nine were based in Tokyo while one was from Kyoto. There are 63 VC firms reported in the top 106 with head offices in Tokyo, so our sample of 39 VC firms was representative of the population of Tokyo-based VC firms.

The final sample of firms was categorized into 25 affiliated and 15 independent VCs. Affiliated VCs are those in which a majority owner is a corporation (i.e., securities company, bank, insurance company, or nonfinancial firm), whereas independent ones are those not controlled by another firm.

5.2. Variables

5.2.1. Dependent variables

The two dependent variables used in this study, active monitoring and diversification, were measured as follows.

Active monitoring is a multidimensional construct measured as the average investment amount per portfolio firm compared to total fund size (*amtfirm*), the ratio of the number of firms to which a VC firm sends a representative director (*director*), and the degree of direct managerial supervision (*active*).

Several studies have looked at the optimal size of investments per VC manager (e.g., [Jaaskelainen et al., 2002](#)). [Cumming \(2001\)](#) showed that the type of venture fund and its capital structure, among other factors, had a systematic impact on the size of the portfolio. Antecedents that lead to more efficient information processing would support larger portfolios. The [Cumming \(2001\)](#) study also implies a trade off between the size of a portfolio and the efficiencies to be gained from risk reduction. Therefore, everything else being equal, a larger investment in each portfolio relative to total firm size (*amtfirm*) exposes the VC firm to greater financial risks since the potential loss from each portfolio is now greater. Thus, the larger the investment amount, the greater the incentives to closely monitor the investee firms to attenuate the probability of catastrophic losses.

Director measures the degree a JVC is able to bridge the information asymmetry that exists between the VC manager and itself by creating more information conduits into the boardroom. As [Prowse \(1996\)](#) argues, board representation is a form of direct control exercised by a VC.

Active is defined as the day-to-day supervision of management and is measured as the fraction of portfolio firms in which the VC firm has direct managerial supervision. Each interview respondent was asked to provide his/her own assessment of his/her own VC firm in terms of their degree of involvement in managerial supervision. Based on the information given by the interview respondents, *active* was categorized into the following categories: 1 = no involvement, 2 = active involvement for less than 10% of portfolio firms, 3 = active involvement for 10–30% of portfolio firms, and 4 = active involvement for over 30% of the portfolio firms. Each category shows how much of its portfolio firms, a VC firm is involved in active management. [Sahlman \(1990\)](#) views this as another form of direct control. These data were collected directly from structured interviews.

Diversification was measured in two ways. Due to limitations on data access and information, we were not able to calculate Herfindahl or entropy measures of portfolio diversification. Thus, we used a multidimensional measure of diversification as a way to achieve construct validity. By sensitizing this measure to the VC industry in Japan, we believe that what we lacked in generalizability, we compensated for in face validity.

First, the construct was measured as a JVC's investment policy regarding diversification into information technology (IT)-related sectors. IT is thus the proportion of investments in IT-related sectors to total portfolio value. A higher ratio indicates a greater concentration of investment in IT-related sectors, or conversely lower diversification into other sectors. The reason we used the IT sector is that during the period of the study, IT represented the fastest growing sector for private equity investments in Japan. Many VC firms were founded to exploit opportunities perceived in the IT boom. Therefore, a policy of only investing in that sector indicates a *focus* on high mean-variance outcomes, while a policy of hedging against the sector by *diversifying* into non-IT sectors indicates a more conservative investment approach. We also measured the ratio of early stage investment amount in total investment amount (early stage). We define firms in early stage as those operating for less than 3 years from founding. A higher ratio shows a greater focus on investment in early stage firms, and thus indicates less diversification in terms of investment stage. The data were collected from *Venture Club* articles and corroborated by the structured interviews.

Although these measures were unconventional, our later results appear to be broadly in line with the extant literature—diversification is a means of risk reduction and therefore not rewarded in pay for performance schemes—and thus, the measure at least has some degree of face validity, although a standard approach would have led to more robust tests.

5.2.2. Independent variables

Affiliation is a dummy variable that shows whether a JVC is affiliated with another firm through equity ownership. The variable is coded 1 if the JVC is affiliated to a corporate parent and coded 0 if it is an independent entity. *Pay* is also a dummy variable that shows whether a JVC uses performance-based compensation. If a VC firm uses performance-based pay, we assigned 1, otherwise it takes the value of 0. The data were culled from interviews, *Venture Club* articles, and the *Nikkei Financial Journal*.

Managerial ownership is the share of total equity held by investment managers in their own VC firm. There are a few VC firms in our sample where the VC managers owned 100% of their own firm's equity (see [Table 1](#)), which makes them akin to business angels. In such firms, we can argue that there is no agency problem. However, we did not exclude these JVC firms because we wanted to maximize the variance in our sample to more properly explore the effects of managerial ownership on JVCs' investment choices. The data were collected from *Venture Club* articles and documents provided by each VC firm after their interviews.

[Table 1](#) shows the descriptive statistics for the variables while [Table 2](#) shows the bivariate correlations of the variables. Measures 1 to 5 in [Table 2](#) are the dependent variables while measures 6–8 are the independent variables. From [Table 1](#), we can see that some JVCs send no directors to their investee firms, while there is at least one JVC that sends its own managers to 92% of its portfolio firms. We can also tell that over 60% of our JVCs are affiliated with a financial institution or other company while less than 40% are independent.

[Table 2](#) shows the bivariate correlations of the variable. *Affiliate*, *pay*, and *mgtown* are measures corresponding to the latent constructs: *affiliate*, *pay for performance*, and *manage-*

Table 1
Descriptive statistics

	Minimum	Maximum	Mean	S.D.
Investment per portfolio firm/total fund size (amtfirm) (in hundred million yen)	.06	10.00	2.061	2.656
Number of firms with VC rep/total number of portfolio firms (director) (%)	.00	92.00	13.825	24.494
Degree of direct VC supervision (active): 1–4	1.00	4.00	2.625	1.170
Amount of investment in IT sector/total portfolio value (IT) (%)	10.00	100.00	57.917	25.617
Amount of investment in early stage firm/total portfolio value (early stage) (%)	10.00	100.00	42.917	25.729
Is the JVC affiliated with another firm through equity ownership? (affiliate): binary	.00	1.00	.625	.490
Performance-based pay for VC managers? (pay): binary	.00	1.00	.500	.506
Share of VC firm equity owned by VC managers (mgtown) (%)	.00	100.00	20.150	34.299

ment ownership, respectively. IT and early stage are measures of the dependent latent construct portfolio diversification. Amtfirm, director, and active measure the dependent latent construct active monitoring.

This table shows several interesting relationships. First, it shows that amtfirm is highly correlated with director and active, which suggests that a larger investment exposure to a single firm leads a JVC to increase its monitoring through director transfer and hands-on approach. Also, affiliate is negatively correlated with and pay and mgtown are positively correlated with both director and active (active monitoring variables). Furthermore, affiliate is negatively correlated with and pay and mgtown are positively correlated with early stage, which is one of the diversification variables. These relationships appear to suggest that our hypothesized relationships can be supported.

Table 2
Correlation table

	1	2	3	4	5	6	7
1.Amtfirm	1.000						
2.Director	.547**	1.000					
3.Active	.434**	.557**	1.000				
4.IT	.073	.097	.225	1.000			
5.Early stage	.155	.399*	.584**	.516**	1.000		
6.Affiliate	-.224	-.648**	-.520**	.052	-.335*	1.000	
7.Pay	.274	.478**	.801**	-.012	.542**	-.568**	1.000
8.Mgtown	.298	.772**	.612**	.199	.567**	-.768**	.537**

* P<0.05.

** P<0.01.

*** P<0.001.

6. Analytical method

Because we conducted structured interviews to obtain fine-grain data from the field, we ended up with a relatively small sample of 40 firms. Traditional nonparametric analysis is usually indicated for hypothesis testing of small sample sizes. However, because our model includes multidimensional latent constructs, standard nonparametric analysis is not the appropriate analytical strategy. Instead, we used partial least squares (PLS) with bootstrapping, a nonparametric technique specifically designed to deal with our data limitations and research model (Chin and Newsted, 1999).

PLS is a confirmatory, second-generation, multivariate analytical technique (Fornell, 1987). Like structural covariance analyses such as LISREL and AMOS, PLS allows for the examination of both latent (theoretical) and manifest (measured) variables. LISREL-type programs and PLS are similar in that they include the following elements: (1) modeling of observation error; (2) involvement of theoretical and empirical variables; (3) confronting theory with data; and (4) combining theory with data (Fornell, 1987). However, LISREL-type programs are a special case of PLS that assumes that measures are all normally distributed. Alternatively stated, PLS is a nonparametric method.

Consequently, PLS offers two important advantages for this study over the more familiar structural covariance analytical methods: (1) PLS can be used on very small data sets, since we are not relying on a sufficient sample to invoke the central limit theorem (Wold, 1980), and (2) PLS does not require the assumption that independent variables are uncorrelated, since the technique lacks the assumptions and restrictions of techniques that assume normally distributed data (Falk and Miller, 1992). However, the coefficients provided by PLS are not by default the best least unbiased estimators (BLUE). But with increased sample sizes, PLS estimates quickly converge on BLUE (Fornell and Bookstein, 1982, Dijkstra, 1983). Furthermore, by using bootstrapping (Efron and Tibshirani, 1993) it is possible to obtain *t* tests that are indicative of the stability of the coefficients.

In sum, we selected PLS as a method for the following reasons:

- (1) Our intent is to explore a theory that has heretofore seen limited testing.
- (2) Our target population, and thus sample, is very small (Chin and Newsted, 1999).
- (3) Our indicators are formative and reflective.
- (4) Our theoretical variables are defined (Falk and Miller, 1992).

PLS divides a model into a series of blocks, each containing one dependent variable and two or more independent variables. In a recursive or mediated theoretical model, the dependent variable in one block may in turn be an independent variable within another block. OLS regression is then used to estimate the parameters for each block, with the results used as the basis for further iterations in the other blocks. This process continues as long as successive iterations can reduce the error of the estimate and increase the explanatory power of the model. The result is a set of coefficients with a percentage of the variation explained by each theoretical construct in the model.

In Step 2, the application of a bootstrapping algorithm to the PLS result allows us to determine the stability and statistical significance of the coefficients linking the (a) manifest to latent and (b) latent to latent constructs. The bootstrap procedure involves creating a large number of equal-sized subsamples using random selection with replacement from the original data sample. One thousand subsamples are usually sufficient for convergence to BLUE (Hall, 1986; Booth and Sarkar, 1998). Each subsample is then used to generate a set of coefficients using PLS, to which t tests are applied. Statistically significant t values indicate that even with a large number of recombined existing data points there is enough nonrandom variation in the data to yield stable coefficients for the predictors in the model. In sum, PLS offers results with small data samples, does not require multivariate normality, and converges on best least unbiased estimators with increasing sample size and statistically significant results.¹²

7. Results

The best fit between the data and model is offered in Fig. 2. The model explains 39% of the variation for VC firms that pursue a portfolio diversification strategy and 76% of the variation for VC firms that pursued an active monitoring strategy. It is worth noting that the active monitoring strategy construct involves three separate measures, whereas portfolio diversification construct involves only two measures. This difference partially explains the greater explanatory power of monitoring strategy, since we expect explanatory power to increase as the number of measures increase. It is also worth noting that the three measures of active monitoring strategy all have high loadings that fall within a small range (.84, .87, and .88). This suggests that the three measures all load heavily and almost uniformly onto the theoretical construct-activity monitoring strategy, indicating a high level of construct and face validity. Fig. 3 provides the results of the model using bootstrapping to test for the statistical significance (stability) of the coefficients.

First, the relationship between affiliation status and the two VC risk management strategies are not statistically significant (Fig. 3). Thus, H1a and H1b are not supported by the data. Next, the relationship between performance pay and portfolio diversification has a magnitude of 0.30 and is not statistically significant (t value of 1.15). The relationship between performance pay and direct monitoring has a magnitude of 0.34 and is statistically significant with a t value of 3.62 (Fig. 3). Thus, H2a is strongly supported by the data, whereas H2b is not supported.

¹² So why has its use been limited? This may be attributed to the initial inability to test for statistical significance, computational intensive nature of the procedure and lack of user-friendly software. Developments in bootstrapping allowed for the testing and verification of statistical significance. Later, Chin and Frye (1995) came along with a user-friendly PC-based package to replace earlier software based on Loehmoeller (1981) work. Thus, the barriers to using PLS have recently been overcome, rendering this method accessible to researchers who have to explore nonnormally or symmetrically distributed data from small sample sizes.

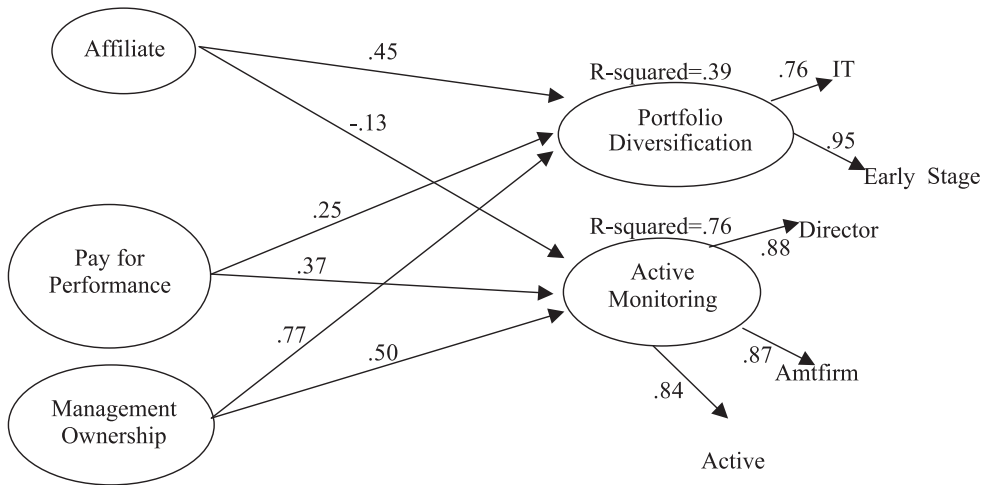


Fig. 2. Full model.

The relationship between share ownership by management and direct monitoring has a magnitude of 0.43 and is statistically significant with a *t* statistic of 1.86. The relationship between share ownership by management and diversification has a 0.84 magnitude and is statistically significant with a *t* statistic of 2.45 (Fig. 3). Hence, H3a and H3b are supported by the data.

In sum, the data moderately fit the theoretical model with support for 2a, H3a, and H3b. To understand the phenomenon more completely and verify the stability of our model, we ran a trimmed model based on the statistically significant coefficients. We confirmed the stability of our results and although we do not report the model here, it is available from the authors.

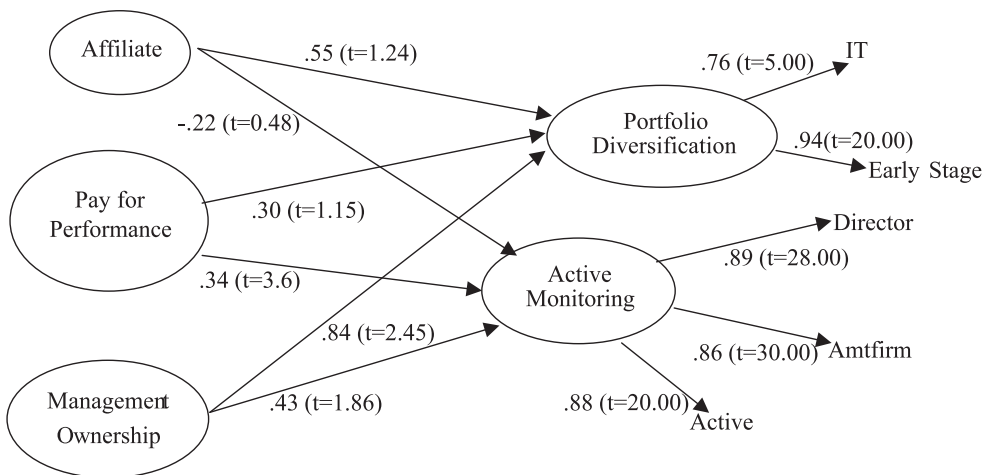


Fig. 3. Full model with bootstrap 2000 subsamples. Note: T-value stated for statistically significant relations.

8. Discussion and conclusions

This paper examined two risk management approaches used by JVC firms—portfolio diversification and direct managerial monitoring—and the factors that determined how they were chosen. From agency theory, we hypothesized that corporate affiliation, compensation schemes for investment managers, and management equity ownership determined the choice of risk management approach. The data show that both performance-based pay and managerial ownership are positively related to direct managerial monitoring while managerial ownership is negatively related to portfolio diversification. Although the final effects are small, due in part to the sample size and the constrained model, our results provide some support to the agency theory predictions. While our hypotheses on the corporate affiliation were not supported, other important managerial incentive-based hypotheses were supported, which provide another piece of empirical support to the popular framework used in many U.S.-based studies on VC. Thus, our findings provide some support for the use of standard agency theoretic formulations for non-U.S.-based VC studies.

We theorized that an affiliated JVC would more likely adopt a passive risk management approach since this reflects the strategic objectives of its larger parent, which in the Japanese corporate context is focused on stabilizing rather than maximizing portfolio cash flows. However, *affiliation* was not statistically related to risk management approaches and a closer examination of the correlation table shows why. In fact, the correlation table (Table 2) and full model (Fig. 2) report that JVCs affiliated to financial institutions or other corporate firms had ownership and control structures typically associated with the portfolio risk reduction, rather than value maximization, objectives of their parents. However, it was also highly correlated with the more specific dimensions of ownership and control, implying that it may be measuring the same thing. In hindsight, we should have expected this because it is unlikely that affiliated JVCs could be structured as entrepreneurial units, with the implications for radically different ownership and compensation systems. Basic organization theory suggests that doing so in a culturally monolithic context (i.e., the Japanese corporation) would create internal conflicts in the reward system, which could be severely disruptive to morale and operational effectiveness. Thus, the only type of JVC that could adopt shareholder wealth maximizing approaches would be the independent ones. In short, there was no variance in the data between affiliation status and ownership and control, which accounts for the lack of findings.

From a methodological standpoint, this study contributed to the entrepreneurship literature by illustrating a method, structural equation modeling with PLS, that is well tested and utilized in disciplines of management but is still relatively novel in entrepreneurship research. PLS is particularly well suited to entrepreneurship research since it allows for structural equation modeling in circumstances in which the data set is small and/or the assumption of normally distributed data is inadvisable. Such is the case with much of entrepreneurship research, particularly when the domain is constrained to specific industries or life stages but where meaningful statements of causality can be made. Here, the researcher is confronted with either small data sets or variables that seriously violate the assumptions of normality, in either

of these cases it is likely that the results have been, at best, considered with great suspicion. Through the use of PLS nonnormal data or small data sets can now be used and the results can be looked on with the same or greater confidence as studies based on larger data sets.

In terms of future research opportunities, extant studies in VC often suffer from the lack of nuanced data, which can lead to gross generalizations. In this study, we attempted to obtain finer grained data by conducting field interviews with venture capitalists but were still forced to use binary measures for variables (e.g., compensation) that in other studies would have contained more information. Our informants were simply not willing to be more specific although the study (indeed most studies like it) could have benefited from higher quality measures such as data on compensation contracts, portfolio structure, and even management styles. The VC community around the world is known to be tight-lipped with an ethos that puts a premium on access to private information as a competitive advantage in deal making. This study points to the criticality of researcher credibility and personal networks. It suggests that advances in VC research would mostly likely come from teams of researchers (e.g., [Manigart et al., 2002](#)) who can combine their personal networks to obtain field-based panel data rather than those that rely solely on secondary data.

The managerial implication of our study is this: that venture capitalists should be as concerned about the structure of their incentive systems for their fund managers as they are for their investee-firm entrepreneurs. Agency theory says that contingent compensation is a self-governing mechanism for individual effort that is difficult to measure and verify. However, such schemes must be sensitive to the organizational context in which they are applied. When organizational culture puts a premium on distributive justice, as it is the case with many large Japanese corporations, some forms of contingent compensation such as equity ownership may be difficult to implement. This may be particularly salient for JVCs that are affiliated with other organizations. Nonetheless, our findings suggest that managerial incentives through performance-based pay or ownership can affect a JVC's choice of risk management approach.

In conclusion, our contribution to the research literature is a closer examination of the VC firm and VC manager relationship. Whereas it has generally been assumed that an agency gap exists between the VC firm and venture-backed entrepreneur, there appears to be an implicit assumption in the literature that the interests of the VC firm and VC manager converge. We built a model to test this and have shown that variations in compensation and ownership can explain the variations in strategic choices of the managers. In conclusion, our study suggests that general formulations of agency theory appear to operate just as well in the Japanese relational exchange context as it does in the Anglo-American transactional exchange context. Such approaches are particularly useful for modeling governance problems resulting from information asymmetry, unequal risk bearing, and uncertain cash flows.

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