

FINANCIAL INTERMEDIARIES, OWNERSHIP STRUCTURE AND MONITORED FINANCE: EVIDENCE FROM JAPAN*

Douglas Cumming

Director, Severino Center for Technological Entrepreneurship
Lally School of Management and Technology
Rensselaer Polytechnic Institute (RPI)
Troy, New York 12180 USA
Web: <http://ssrn.com/author=75390>
<http://lallyschool.rpi.edu/>
<http://www.scte.mgmt.rpi.edu>
Email: Douglas@Cumming.com

Grant Fleming

Wilshire Private Markets Group
P.O. Box 330, Canberra ACT 2601, Australia
Telephone: +61-2-6279-6000
Email: grant.fleming@wilshire.com

And

School of Finance and Applied Statistics
Australian National University
Canberra, Australia

Armin Schwienbacher

University of Amsterdam
Finance Group
Roetersstraat 11
1018 WB Amsterdam
The Netherlands
Telephone: +31-20-525 71 79
Fax: +31-20-525 52 85
E-mail: A.Schwienbacher@uva.nl
Web: <http://www.fee.uva.nl/fm>

3 Jan 2006

* We owe thanks to the participants at the Global Finance Conference (2005, Dublin) for helpful comments and suggestions.

FINANCIAL INTERMEDIARIES, OWNERSHIP STRUCTURE AND MONITORED FINANCE: EVIDENCE FROM JAPAN

Abstract

This paper introduces new and unique data from 127 Japanese private equity funds that enable a first-ever direct comparison of individual owner-manager structures versus financial intermediation structures in terms of the governance provided to investee companies through private equity funds. The data indicate individual owner-manager structures (financial disintermediation) give rise to much smaller portfolios of entrepreneurial firms and more advice to entrepreneurs. Across the scope of different financial intermediation structures including banks, life insurance companies, securities firms, corporations and government bodies, there are further differences in the provision of governance and value-added advice provided to investees. The data further indicate US-affiliated funds in Japan are more likely to have smaller portfolios and provide more advice to entrepreneurial companies, possibly due to a greater skill set in providing advice to facilitate the development of small entrepreneurial firms.

Keywords: Financial Intermediation, Ownership Structure, Private Equity

JEL Classification: G24, G28, G31, G32, G35

1. Introduction

Financial intermediation involves banks and other institutional investors playing pivotal roles in transforming savings into investment, thereby facilitating liquidity, information, and consumption smoothing. Financial intermediaries also serve as a commitment mechanism and provide delegated monitoring to the organization to which they provide capital. While there is a substantial body of research on these traditional functions of intermediaries, less is known of how financial intermediaries perform when they extend their boundaries to new business areas such as the provision of monitored finance (like venture capital). Indeed, a recent review of the financial intermediation literature by Gorton and Winton (2002) illustrates that our understanding of financial intermediation and its interplay with monitored financiers is incomplete (see also Allen 2001; and Allen and Santomero 2001). Are there costs associated with banks and non-bank intermediaries as monitored financiers as compared with other, non-intermediated providers such as owner-manager investors? This paper provides quantifiable measures that allow us to examine effects of financial intermediation as it pertains to monitored finance.

The involvement of financial intermediaries in monitored finance varies by country of domesticity. Banks in Japan have traditionally held equity in firms while maintaining debt relationships (Hamao, Packer and Ritter 2000; Mayer *et al.* 2004). In the US banks have been permitted to hold equity in cases where a firm is undergoing financial restructuring. The extension of financial intermediation into monitored finance is most stark, however, in cases where banks supplement their financial intermediation role with the provision of equity to private firms in the form of venture capital. Banks compete with venture capital and private equity funds (hereafter collectively referred to VC funds) which are typically organized as limited partnerships with owner-manager funds (the general partner) receiving capital from institutional investors (including pension funds, banks, life insurance companies, etc.) (the limited partners). VC funds reinvest capital in non-publicly traded entrepreneurial firms under the conditions set out in a limited partnership agreement.¹ Relative to banks, VC funds tend to have a more pronounced role in corporate governance and monitoring in the companies that they finance (Gompers and Lerner, 1999a, 2001a, b) in order to solve more severe agency problems. Indeed, the agency problems between capital

¹ Gompers and Lerner (1999a, 2001a,b) (see also Gompers *et al.*, 2004) provide seminal analyses of most issues in venture capital (VC) finance; for a literature survey, see Berger and Udell (1998); see also Bergemann and Hege (1998) and Casamatta (2003) on VC contracting, Kannianen and Keuschnigg (2003, 2004) on VC portfolio size; Neus and Walz (2004) on VC exits; Casamatta and Haritchabalet (2003) on VC syndication. Almost all of the VC funds in Japan (the focus of this paper) are generalists in the sense that they consider at least some traditional early stage venture investment as well as at least some later stage private equity investment; we control for different stages in our analyses, but do not (and cannot) exclude funds on the basis of considering certain stages in part of their portfolio investments.

providers and entrepreneurs in privately held high-growth companies, it is argued, primarily accounts for the existence of venture capitalists (although there are other explanations).²

In this paper we extend existing research on what it is that financial intermediaries do and the roles they play in the companies that they finance. Our analyses are most similar in spirit to Mayer *et al.* (2004) and Lerner *et al.* (2004) in that we study the effect of sources of funds on VC activities. Mayer *et al.* show sources of funds affect investment decisions of VC funds, and find international differences across Japan, Europe and the U.S. Lerner *et al.* find endowments are much more likely to be invested in VC funds that yield higher project returns in the U.S. In short, these two seminal analyses identify the importance of the source of funds in the activity and success of VCs in their investee companies. Our paper investigates this concept to more closely explore how the extent of VC activities and governance differs by source of funds. To this end, our paper introduces a new dataset from Japan that enables unique direct comparisons of banks with other financial intermediaries, as well as with individual owner-managers. We evaluate the differences between these groups through two aspects of the provision of monitored finance: governance (portfolio size as measured by the number of entrepreneurial firms per investment professional), and value added (the explicit provision of different types of advice). As the sources of fund differences in our sample are directly attributable to the ownership structure of the funds, we are able to ascertain effects of financial intermediaries in their role as equity providers.

Our analysis highlights clear differences in the way banks and other financial intermediaries act as monitored financiers as compared with owner-manager VCs. We show that more financial intermediation (such as bank-affiliated funds) is associated with less governance of entrepreneurial firms. Individual owner-manager structures (financial disintermediation) give rise to smaller portfolios of entrepreneurial firms per manager, leading to more governance and monitoring of management in the entrepreneurial firm. Based on a non-linear Box-Cox model, we show that a fund that is 100% owned by an individual/manager will finance approximately 20 fewer companies per VC manager (a move from approximately the 75th percentile to the 25th percentile in the data), and thereby provide more monitoring, compared to a fund that does not comprise individual owner-managers. As a related matter, we find that owner manager VCs behave differently in that they offer a greater scope of advice to their portfolio companies relative to bank VCs and VCs of other institutional ownership. These differences are directly related to the fact that individual owner manager VCs are more likely to focus on earlier stage investee companies.

² With the presence of severe moral hazard and adverse selection costs, we expect a group of specialized investors with enhanced ability to monitor and screen investments; see Sahlman (1990), Bascha and Walz (2001a, b), Kirilenko (2001), Gompers and

An added novel feature of our new dataset on financial intermediaries and monitored finance is that it enables a consideration of the impact of US institutional affiliations in Japanese VC funds. The data indicate material impacts on the process of financial intermediation in Japan from an association with US investors, in terms of smaller portfolios per manager and more advice to entrepreneurial companies. The data indicate that the economic significance of US institutional affiliation within Japanese VC funds is in fact comparable in economic significance to financial disintermediation (owner-manager VC funds).³ US-affiliated funds in Japan are more inclined to hold smaller portfolios (thus, more governance), ostensibly to become an established player in the market, and possibly due to a greater skill set in providing advice to facilitate the development of small entrepreneurial firms.

This paper is organized as follows. Sections 2 and 3 discuss related literature and the institutional structure of monitored finance in Japan. Section 4 introduces the data and provides summary test statistics. Section 5 provides multivariate empirical analyses, and section 6 examines differences in fund income. Concluding remarks follow.

2. Monitored Finance

One of the primary roles of financial intermediaries is to facilitate the provision of liquidity. Financial intermediation involves banks borrowing from a large number of agents through deposit contracts, and providing a large number of consumers and firms with liquidity. In general terms, financial intermediaries reduce the costs of search for borrowers and lenders, and facilitate the ability to trade at low transactions costs (Harris, 2003; Kyle, 1985). Given the position of intermediary, banks have a related function as information providers because their role provides access to detailed information not widely available. Seminal work on information by Leland and Pyle (1977) (see also Diamond, 1984) shows that the information gathered by a financial intermediary can be protected (i.e., the intermediary can overcome an ‘appropriation problem’) and can be credibly ensured to be reliable (i.e., the intermediary can overcome a ‘reliability problem’) by issuing securities and using the proceeds to invest in companies in which the intermediary has favorable private information. To this end, financial intermediaries have incentives to invest in the acquisition of private information pertaining to investee companies, which in turn enhances the profitability of the financial intermediary.

Lerner (1999a, 2001a, b). Other explanations include risk-sharing (Gompers and Lerner, 1999a, 2001a, b) and “skills learning” (Chan *et al.*, 1990).

³ By *disintermediation*, we refer to the case of owner-manager funds, where the owner holds a significant fraction of the fund. In contrast, funds that are held by other fund providers (such as banks, corporations or governments) are intermediated funds.

The role of financial intermediaries as providers of liquidity and information collectors leads to banks being key monitors of firm behavior and financial performance. Agents will lend a greater amount of funds to borrowers via a financial intermediary as a result of lower costs of monitoring. Perhaps the most important work on the theory of financial intermediaries as monitors is provided by Diamond (1984). Diamond explains the existence of banks as financial intermediaries in their role as delegated monitors. Lenders lend money to the intermediary, who in turn lends money to borrowers, and the intermediary monitors the borrowers on behalf of the lenders. Financial intermediaries exist by virtue of their structure in that it is less costly for lenders to monitor the intermediary than it is for lenders to monitor the borrower. Further, the greater the size of the intermediary, the lower the cost of monitoring the intermediary, suggesting scale economies associated with the size of the intermediary (Williamson, 1986). These core results in the development of the theory of financial intermediation indicate financial intermediaries play an important role in facilitating monitoring of the companies that they finance.

In addition to the key finance roles of liquidity provider, monitor and information collector banks have also moved into related intermediary functions by providing monitored finance to entrepreneurial firms. Financial intermediaries as monitored financiers have several potential benefits for other financial claimants on firm value. First, Stiglitz (1985) argues that the dual role of debt and equity holder alters the banks approach to monitoring and governance. Traditional debt holders aim to avoid bad outcomes given the fixed income nature of the claim over cash flow and assets. When financial intermediaries hold equity as well as debt (e.g. through venture capital); goal alignment improves as the intermediary is more concerned with maximizing firm value. Second, bank monitored finance may decrease the probability of hold-up by equity holders who would otherwise strive to shift risks to debt holders post contracting/financing (see John, John and Saunders, 1994). When banks also provide equity other equity holders (typically founders/managers of the entrepreneurial firm) let the bank share in the firm's upside potential. In contrast to these advantages, however, Gorton and Winton (2002) report empirical evidence that in countries where banks do hold equity and debt, debt dominates. If this is the case then banks may be willing to trade-off active monitoring and equity claims for minimizing the probability of debt default.

Our paper synthesizes the financial intermediation literature with related work in venture capital. Indeed, several of the functions banks provide as monitor financiers have been addressed in the burgeoning venture capital research. We build on prior work examining the impact of the type of financial intermediary on VC fund size (see Gompers and Lerner, 1998; Jeng and Wells, 2000; and Mayer *et al.*, 2004). Prior VC literature has not explicitly considered this effect (although Gompers and Lerner, 1996,

1998, 1999a, do stress the importance of fund structure). Our examination of the governance undertaken by monitored financiers (portfolio size and span of control) also builds on the prior theoretical work of Kannianen and Keuschnigg (2003, 2004) (see also Keuschnigg, 2003a, b; Keuschnigg and Nielsen, 2001, 2003a, b, c, 2004; and Cumming, 2004). Our dataset of Japanese VC funds enables us to specifically study the impact of ownership structure on the level of governance and value add provided to portfolio companies. We are able to quantify the impact of financial intermediation, with comparison of owner-managers to different types of financial intermediation structures. Such distinctions have not been addressed in prior research.

3. Monitored Finance in Japan

The Japanese financial system provides a natural experiment to examine the impact of financial intermediation on monitored finance. Banks have traditionally played an important role in monitored finance given the “bank-oriented” financial system. There is now a comprehensive literature on the theory and operations of the main bank system in Japan. Early research maintained that main banks (usually the largest lender with the longest relationship) operated as Diamond (1984) delegated monitors, reducing the agency costs associated hidden action and imperfect information (Sheard 1989; Aoki 1990; Prowse 1990; Lichtenberg and Pushner 1994). This work was complemented by evidence that main banks mitigated asymmetric information problems between lenders and borrowers given embedded, long term credit relationships (see, for example, Shin and Kolari 2004). Main bank relationships lead to less liquidity constraints for growth firms, although there is little evidence that investment levels differ between funds with and without a main bank relationship. Recent empirical evidence has emerged that the main bank system in Japan also contains fundamental flaws associated with banks extracting economic rent (through hold-up) from their clients (Weinstein and Yafeh 1998) and favoring creditors over other stakeholders in the governance process (Morck and Nakamura 1999). Hamazaki and Horiuchi (2000) show that main bank supported firms have excelled in spite of their long term relationships due to robust competition in product markets.

The operation of the main bank system included provision of monitored finance to entrepreneurial firms. Bank affiliated VC funds (usually divisions) extended equity capital as part of the banking relationship. Over time banks were joined in the venture capital market by other affiliated VC funds supported by securities firms, corporations and life insurance companies. By 2000 the Japanese monitored finance system comprised firms of diverse ownership structures, allowing a direct comparison of the behavior of banks, non-bank financial intermediaries and specialist owner-manager VC funds

(Hamao, Packer and Ritter 2000; Kuroki, Rice and Abetti 2000; Yoshikawa, Phan and Linton 2004). In the remainder of this section we review different types of monitored financiers in the Japanese market and offer conjectures on how monitored finance may differ depending on the institutional ownership of the private equity funds.

3.1 *Banks and monitored finance*

The earliest participants in the Japanese venture capital market were financial intermediaries. Banks provided monitored finance through establishing divisions within the organization or establishing affiliates/subsidiaries as part of the wider business group. Banks have been major providers of expansion and late stage capital to private sector companies that are in pre-IPO funding rounds. The division or affiliate is typically organized along functional lines, with organizational divisions such as industry analysis, consultation, investment planning. The primary goal of this type of monitored financier is to undertake investments or value-adding activities consistent with the objectives of the affiliation group (Yoshikawa *et al.* 2004; Kuroki *et al.* 2000). Monitored finance becomes one of ways in which the corporate parent achieves its financial and strategic goals.

Several authors have found that financial intermediaries behave differently than other providers of monitored finance. Kuroki *et al.* (2000) report that financial intermediaries in Japan often invest in private funds with a view in order to secure services for their own bank, offer debt and equity to their investee private companies (increasing the likelihood of debt-equity conflicts), and invest with a view to maximizing the operating income from portfolio companies (for example, through cross-selling services) as opposed to adding value and realizing investments over a finite time for maximum capital gain. Hamao *et al.* (2000) find that companies backed by venture capital from financial intermediaries demonstrate lower initial public offering under-pricing as compared with other types of venture capital. Lower under-pricing suggests that banks play a stronger certification role than non-bank venture capital given the benefits of an information-rich lending relationship with portfolio companies. Finally, Yoshikawa *et al.* (2004) argue that bank affiliated VC funds are less likely to engage in active monitoring of their portfolio of investments. Rather, compensation and incentive structures within the bank affiliated fund lead to larger portfolios in order to diversify investment risk and generate lower (but less volatile) returns. They find a negative association between lower powered incentive structures (such as salary bonuses or promotion via seniority) and active monitoring.

Our study provides empirical analysis of observations made by Kuroki *et al.* (2000) and extends analysis of how banks act as monitored financiers provided by Hamao *et al.* (2000) and Yoshikawa *et al.* (2004). Financial intermediaries source capital (predominately) from a diversified pool of depositors, implying a lower opportunity cost of capital than a small group of third party providers. Consistent with Kuroki *et al.* (2000) and Yoshikawa *et al.* (2004) we expect that the objectives of a bank VC lead to larger portfolios of companies (per investment professional), thereby providing a greater opportunity to maximize the pool of potential customers and minimize volatility of returns. We also expect banks to provide less value added relative to specialist owner-manager VC funds as the bank's investment professionals adopt passive portfolio management techniques.

3.2 *Non-bank financial intermediary monitored finance*

The Japanese financial system is characterized by various ownership structures for VC funds. We examine two key non-bank financial intermediary providers of monitored finance: securities company affiliated VC funds and corporate VC funds. Both institutions have been important providers of monitored finance. Securities companies fill a finance services gap in the system given that banks have long been excluded from securities finance activities important in the growth of entrepreneurial firms (although banks have traditionally held equity positions in larger corporations). Corporate investment has been important within the supply chain and as a strategic option to capture/negate competitive threats of new technology. We also briefly discuss life insurance companies and governments as owners of VC funds.

Securities company affiliated VCs provide portfolio companies with capital, value-adding activities and specialist skills in underwriting securities in the event of an initial public offering. As Hamao *et al.* (2000) argue, VC funds affiliated with securities companies face a potential conflict of interest during the exit process, between the opportunity to generate short term gains and the longer term interests of other (non-exiting) equity holders.⁴ Securities company affiliated VCs generate income from both the realization process (maximizing the return multiple on the investment) and the underwriting of the offering. In cases of market power, the underwriter can influence the offer price and the short term market price to the detriment of longer term equity holders. Hamao *et al.* (2000) find that all securities company affiliated VCs in their sample used their parent/owner as the underwriter when listing portfolio companies. Further, investors in IPOs of securities company VC backed funds received higher first day returns as compensation for conflicts of interest. In contrast, owner-manager VC funds cultivate a

reputation in the market by listing only the highest quality portfolio companies (Brav and Gompers, 1997).

Corporate VC funds provide liquidity and technical expertise to entrepreneurial funds operating in similar industries or economic sectors. Gompers and Lerner (2000b) argue that corporate VC funds provide venture finance to secure real options consistent with broader corporate goals and strategic objectives. Gompers and Lerner's (2000b) evidence indicates that a new venture is more likely to be financed by a strategic investor the more complementarities exist with the corporate sponsor. Corporate VC funds allow the corporate headquarters to concentrate on core activities and purchase (fund) a set of real options that may give the firm a window on research and development and/or increase the speed of response to competitive threats. Whether corporate VC funds behave differently to banks or other VC providers has not been investigated. We have no priors, although perhaps corporate VCs provide finance to a restricted set of industries (e.g., information technology, bioscience). Therefore, we do not suggest that value added advice is any different to other financiers. We do expect, however, that corporate VCs will have larger portfolios than owner-manager funds (though not necessarily banks), because larger portfolios increase the optional value associated with venture investing.

Life insurance companies have (typically) been minority owners of VC funds. To the extent that these owners have influence we would expect insurance company affiliated VC funds to have less risk tolerance than other financial institutions that invest in venture capital. In negotiating a limited partnership agreement, life insurance companies with greater ownership in the fund may require covenants that give rise to the VC fund investing in a greater number of portfolio companies (a greater span of control) in order to spread the risk (examples of such covenants are provided and studied in Gompers and Lerner, 1996, 1999a). Risk adverse life insurance companies would find this to be more valuable than a strategy of diversifying their capital across a greater number of VC funds, in view of the costly contracting and negotiation process associated with setting up a fund.

Finally, government related private equity funds are designed to promote investment and business development in their local economy, and will often look to syndicate investments with other market participants to achieve this end. Funds with government backing may have political pressures to spread their capital across a greater number of (and possibly more geographically disparate) portfolio companies (Lerner, 1999).

⁴ Gompers and Lerner (1999b), however, do not find evidence in support of this conflict of interest problem with investment-

3.3 *Owner-manager VC funds: Specialist providers of monitored finance*

The Japanese VC market is further characterized by the existence of owner-manager fund, where the owner is also the investment manager. Unlike the financial intermediaries examined so far, owner-manager VC funds have majority control of the fund, and position themselves in the market according to their fund competencies and competitive advantages. Independent funds are the more recent providers of monitored finance in Japan, often specializing by sector(s), and raising capital from third party providers. In contrast to banks and other financial intermediaries, owner-manager VC funds enter partnership agreements which contain covenants on investment strategy and behavior, and provide longer term interest alignment through profit-sharing on realized investments (carried interest) (Gompers and Lerner 1996). The success and longevity of the owner-manager fund depends on the investment managers' ability to maximize returns to investors.

The arms length relationship with investors and focus on return has the following implications for governance and interest alignment. We expect that owner-manager funds will provide greater corporate governance and more value adding advice by allocating human resources to maximize effort per investment. Optimal resource allocation will be associated with lower portfolio sizes (a lower span of control) and more advice to the entrepreneurial firm. Such behaviour reflects the higher risk tolerance of owner-manager funds given their specialist expertise and skills, and the need for them to produce capital gains on investments (as remuneration is back-end structured through profit share – carried interest) (Gompers and Lerner 1999a).⁵

4. **Data**

4.1 *Institutional background*

We draw on data from the Japanese financial system to examine the costs and benefits of financial intermediation. Venture capital in Japan was established in the early 1970s with financial intermediaries extending equity finance to entrepreneurial firms (Kuroki *et al.*, 2000). During the next twenty years approximately 100 private equity funds raised capital, with 75-80% of these being owned by financial institutions. Two structural changes influenced growth in the late 1990s. First, policy change in 1996

bank affiliated VC funds in the US.

⁵ Recent theoretical work on the differences between banks and specialist VCs in supporting growth companies shows that specialist VCs favor higher returns, higher growth companies and have a higher risk tolerance (Ueda 2004; see also Landier 2003, Black and Gilson 1998, and Berger and Udell 1998).

removed the prohibition against investing in private equity by pension and corporate funds. It has been estimated that more than 45 new private equity funds were established as a result of the legislative changes (Kuroki *et al.*, 2000; Ministry of Economy, Trade and Industry 2001). Second, major structure change took place in the financial system with the establishment of the MOTHERS board on the Tokyo Stock Exchange. The new market provided a (potentially) viable new exit venture for venture capital backed firms, and combined with the rise in information technology investing (especially in the US) spurred new firms to enter the venture capital industry.

The structural changes in the mid- and late-1990s in Japan altered the demand and supply features of the market by permitting a wider range of private equity funds to raise capital and new capital providers (pension and corporations) to enter the market. Figure 1 provides a time series of capital raised (i.e. committed) to Japanese private equity funds between 1990 and 2002. The capital raising cycle in Japan was traditionally out-of-alignment with developed private equity markets in the US and Europe, with little capital raised in 1997 and 1998 (see Gompers and Lerner, 1998, and Lerner, 2002a, on fund raising in US, and Jeng and Wells, 2000, on fundraising in other countries). Since 1999 however, Japanese funds have enjoyed increased capital inflows. Between 1999 and 2000 forty-seven funds raised 79 funds totally \$3.2 billion (¥333 billion), representing 45% of all capital raisings. The number of funds raised decreased substantially in 2001 and 2002, again more in line with international market trends.

[Figure 1 About Here]

While fund raising cycles have become more interdependent since 1999, the Japanese market differs from established private equity markets in two key institutional characteristics. First, the supply of private equity capital in Japan is still provided largely by corporations, banks and insurance companies. Indeed, in 2000 corporations (48%), banks (25%) and insurance companies (13%) accounted for 86% of committed capital. Pension plans, the traditional private equity investor in the US, have been the more recent entrants in the Japanese market but only provided 9% of committed capital in that year (see Mayer *et al.* 2004 for similar data for 1999). Furthermore, the domesticity of capital remains high with Japanese providers making up 76% of capital committed in 2000 (Asian countries providing 4% and Non-Asian countries provided 20%).

4.2 *Sample and variable measurement*

Our data are drawn from the 2000 annual survey of Japanese venture capital undertaken by the Venture Enterprise Center (VEC), under instruction from the Japanese Government's Ministry of Economy, Trade and Industry. In 2000 The VEC was asked to perform a comprehensive survey of the industry. A population of 185 VC funds of all ownership types was identified by the VEC using the following criteria: (1) the VC fund has a major office in Japan; and (2) the VC fund invests in portfolio companies as a VC investor (whether through equity or debt instruments). Financial institutions that made investments in inter-related firms (e.g. a parent into a subsidiary) were excluded because such transactions "could not be considered as an investment aiming at capital gain" (p. 1). The survey questionnaire comprised eight sections covering organization and personnel; VC fund finances; capital funding; investment stages; portfolio composition; exit data; investment by region; and investment by sector. Comprehensive data were received from 127 VC funds (a 69% response rate) and reflect self-reported information as at 2000. Our conversations with the VEC indicate that the Ministry's involvement in the sponsoring the survey led to the high response rate and depth of information from participants. Unfortunately there are no other publicly available data sources to provide cross verification of responses, although we have no reason to expect responses to be unrepresentative.⁶

Table 1 reports the definitions of variables used in this study. The VEC survey provides quantitative and qualitative information on the responding VC funds. Therefore we have adopted the majority of our definitions from the VEC to maintain data integrity, and coded qualitative data to allow statistical analysis.

[Table 1 About Here]

We standardized portfolio size by the number of investment professionals in order to measure span of control. Returns to scale are captured in Box-Cox regressions. Firm age is measured as the number of years between the vintage year of the firm's first raising and the reporting date (year 2000). US affiliation is defined as a VC fund with a US institutional investor. Finally stage and industry focus of the fund are measured using indicator variables. Given that the data are cross-sectional for year 2000 we do not control for market conditions at the time of the survey.⁷

⁶ Mayer *et. al.* (2004) use self-reported data on 62 VC funds in their cross-country analysis. Other studies on Japanese VC exhibit smaller samples.

⁷ We do control for firm age. The period leading up to 2000 is associated with increasing market returns (as well as money chasing deals, at least in the US; Gompers and Lerner, 2000a), and hence is strongly positively correlated with age in our sample.

4.3 *Sample characteristics and summary statistics*

Figure 2 provides a three-dimensional bar graph for fund ownership, type of owner and number of funds. Single owner VC funds (100% equity held by one group) are more common for owner-managers and corporate VC funds. Banks typically hold minority ownership (up to 20%) positions, while corporate VC funds and other financial institutions take “controlling” minority equity positions up to 50%. Government VC funds are most likely to be syndicated with other parties given their tendency to hold equity below 20%.

[Figure 2 About Here]

Table 2 Panel A presents the complete sample (row 1) as well as univariate difference tests for fund ownership levels of at least 10% (rows 2 – 9), and for US affiliated funds (row 10). We focus on differences by fund capital per VC manager, portfolio size per VC manager, and scope of advice (the number of types of advice). Panel B presents the data for different types of value-added advice (personal referral, management consulting, client intermediary, technology broker, and business broker).

[Table 2 – Panel A and B About Here]

Table 2 indicates a number of significant differences associated with the 21 funds with owner-managers of at least 10% ownership. First, in Panel A note that owner-manager funds take on much smaller portfolios per VC (average of 2.1 and median of 1.5) relative to the other funds (average of 8.5 and median of 6.0). This indicates that individual owner-manager funds are much more interested in taking a greater amount of time to add value to each of their investee companies (Kanniainen and Keuschnigg, 2003, 2004). Second, although there are no statistically significant differences in the scope of advice provided at the univariate level (Panel A), there is evidence that owner-manager funds are much more likely to provide more business broker advice (Panel B) (the owner-manager funds are also more likely to provide each of the other types of advice indicated in Table 2 Panel B, but the univariate differences are not statistically significant).

Bank VC funds, in contrast to owner-managed funds, have much larger portfolios per manager (Table 2 Panel A indicates an average of 9.1 investee firms per VC for bank-owned funds and a median of 6.8 compared to an average of 6.6 and median of 3.6 for non-bank funds). On average, bank-owned

funds also provide a smaller scope of advice (an average of 2.1 types of advice for bank funds relative to an average of 2.8 types for non-bank funds). Table 2 Panel B indicates bank-owned funds are statistically less likely to provide technology broker and business broker advice than the non-bank-owned funds.

We do not observe any statistically significant differences in the univariate comparison tests for securities company affiliated VC funds. Corporate-owned funds provide a significantly smaller scope of advice (mean of 2.1 and median of 2.0) relative to non-corporate-owned funds (mean 3.1 and median 3.0). Corporate VC funds are also statistically much less likely to provide each of the specific types of advice indicated in Table 2 Panel B (each comparison of proportion test is statistically significant with the exception of the dimension for technology broker which is marginally insignificant). Corporate funds also tend to be smaller on average in Japan (Table 2 Panel A). VC funds owned by life insurance companies in Japan have the largest portfolios per VC manager (an average of 15.4 companies per manager and a median of 8.9). Life insurance owned funds are more likely to provide client intermediary advice than any other type of funds (92% of funds with more than 10% life insurance company ownership provide client intermediary advice).

Funds with ownership from other financial institutions (such as pension funds) tend to raise less capital (in terms of the median, at ¥16 million). Such funds also provide a smaller scope of advice (2.2 types on average), and in particular are less likely to provide personal referral advice and business broker advice (Panel B). We do not observe statistically significant differences in regards to government owned funds in the univariate comparison tests (largely because there are only four such funds in the data). Nevertheless, it is noteworthy that such funds tend to have the most capital per manager (average of ¥72 million and median of ¥78 million). Finally, funds with a US affiliation exhibit characteristics that are similar to owner-manager funds in that they finance fewer companies per VC manager (4 on average, compared to 7.8 for non-US affiliated funds) and offer a greater scope of advice (3.8 on average, relative to 2.4 for non-US affiliated funds) (both the mean and median tests indicate significant differences for both). US affiliated funds are also more likely to provide business broker advice (see Table 2 Panel B).

Table 3 provides a correlation matrix across a number of variables in the dataset. The comparison tests in Table 2 are consistent with the correlations indicated in Table 3; for instance, owner-manager funds are more likely to provide a greater scope of advice (correlation is 0.20 and significant at the 5% level) and more likely to finance fewer companies (correlation is -0.21 and significant at the 5% level). As well, there are extra items in Table 3 of importance. First, note that owner-manager funds are much more likely to finance early stage companies (correlation is 0.55 and significant at the 1% level).

Second, funds with more capital raised include US-affiliated funds, older firms (in terms of age and number of funds raised), and funds that provide more advice to their investee companies. Finally, it is noteworthy that some of the variables of interest for explanatory purposes in our multivariate tests are correlated; as such, we are careful to consider robustness of the results to included variables in the multivariate analyses presented in next section.⁸

[Table 3 About Here]

5. Effects of Financial Intermediation: Multivariate Analysis

Our central research proposition has been that the ownership of financial intermediaries providing monitored finance influences governance and monitoring (portfolio size/manager), and value adding behaviour (types of advice provided). The univariate tests presented in the prior section offered some confirmation of these hypotheses. This section provides more formal multivariate tests. Subsection 5.1 outlines the methodologies considered. Subsections 5.2 and 5.3 present results pertaining to governance (portfolio size/manager) and value adding behaviour (scope of advice).

5.1 *Empirical methods*

We make use of Box-Cox regressions in our analysis of governance in subsection 5.2. As for our analysis of scope of advice in subsection 5.3, we use ordered logit regressions. The Box-Cox transformations to independent variables (other than the dummy variables) are used to capture nonlinearities in the factors that account for these dependent variables. An alternative, simpler, approach would be to use logs. The Box-Cox model accounts for the possibility of a logarithmic specification; however, it is much more general in that the transformation that maximized the log-likelihood function might not be exactly a log specification.

Following the conventional notation, λ is used to denote the transformation variable for the right-hand-side variables. The transformation yields a convex relation when $\lambda > 1$, and a concave relation when $\lambda < 1$. Maximum likelihood optimization and grid searches were used to optimize the value of the loglikelihood function to ascertain the appropriate value for λ given the data. The Box-Cox grid search

⁸ For example, to deal with correlation between ownership variables we use Box-Cox regressions for nonlinearities on the effect of changing ownership percentages on our dependent variables of interest. We also consider measures of ownership concentration (and in particular, we report the results with a Herfindahl index). Other specifications not explicitly presented are available upon request.

was sufficiently broad (-2 to +2) to allow for the possibility of concavity and convexity. The Box-Cox transformation is as follows:

$$B(x, \lambda) = \begin{cases} \frac{x^\lambda - 1}{\lambda} & \text{when } \lambda \neq 0; \\ \log(x) & \text{when } \lambda = 0. \end{cases}$$

where x represents the independent variables, and $\log(x)$ is the limit of $(x^\lambda - 1)/\lambda$ as $\lambda \rightarrow 0$. Note that the transformation is applied to variables that are *not* dummy variables (see, e.g., Greene, 1997).

The linear OLS model is presented for comparison (model 2); models 1 and 3 – 5 involve Box-Cox estimations, with consideration to heteroscedasticity. Significant correlations are observed among some of the variables, particularly the entrepreneurial firm and transaction specific variables; as such, regressions are provided with alternative right-hand-side variables to show robustness. The heteroscedastic specification is as follows: $\text{Var}(\varepsilon) = (\sigma^2)[w^2]^{(\lambda)}$, where w = fund duration. This heteroscedastic specification was employed to account for non-normality of the error terms. The weighting variable in each of the different regressions was selected on an intuitive basis. There is a possibility of unobserved investments (that is, after 2000 in our dataset) that have not yet been carried out, and hence, it seems natural to control for heteroscedasticity due to unobserved investments based on how many years the fund has been making investments (consistent with Cumming, 2004).

Our right-hand-side variables include four main categories of variables: venture capital fund characteristics, including ownership (a category of ‘other types of owners’ indicated in Table 2 is suppressed to avoid collinearity), age, the number of prior funds raised, average years of experience of venture fund managers, the stage focus of the fund (tendency to originate deals as a lead investor, seed, early, mezzanine and buyout stage; a variable for balanced stage is suppressed to avoid collinearity), and various variables for the industry focus of the fund. The variables are as defined in Table 1. Note that our right-hand-side variables do not include a variable for market conditions because all of our data are measured for the funds as at 2000, and we include a variable for fund age which is highly correlated with market conditions. That is, a recently established fund relative to the year 2000 will have a young age in the data, and will have started when market conditions were very strong, whereas an older fund will have been initiated when market conditions were less robust. Some of the regressions have slightly different numbers of observations, as observations were skipped where data for all included variables were incomplete (various alternative approaches to account for incomplete data did not materially affect the results; alternative specifications are available upon request).

In regards to fund characteristics, note that we also include a Herfindahl index of the ownership concentration of the fund, which is directly correlated with the extent the ownership of the fund is tied to a single institution. A similar alternative variable that we considered was a dummy variable for ‘captive funds’; however, that variable was very highly positively correlated with the Herfindahl index, so that it would not be possible to consider both variables simultaneously, and little new information was gleaned from considering that variable in the regressions. We also considered variables for captive funds that were not owner-managers (e.g., 100% bank owned), but again, that variable was very highly correlated with the Herfindahl index, and there was little new information derived from such variables over and above the other variables explicitly reported. We further explored other types of non-linearities in the data (to account for the possibility of changes in the sign of the relations, as in Morck *et al.*’s, 1988, study of entrenchment and alignment of managers in public companies), but found no significant sign changes (and likewise, plots of these variables did not reveal the presence of sign-reversal non-linearities of that type). Other specifications with other variables not explicitly reported are of course available upon request from the authors.

Various model selection criteria supported the heteroscedastic Box-Cox models presented in the tables, relative to the linear specification and other specifications considered but not reported. Because the data generally support the first model in Tables 4 and 5 with the complete set of right-hand-side variable considered, we focus our discussion of the results on Model 1. The other models are presented to explicitly illustrate robustness to other included/excluded variables.

Finally, note that one may wonder about endogeneity concerns with respect to institutional ownership. For instance, could it be that entrepreneurial firms in need of more governance self select towards venture capital funds that have more individual ownership? This is unlikely in the data for a variety of reasons. Most importantly, prior to the availability of our data, institutional ownership of VC funds in Japan was largely unknown. Only with the exception of wholly owned banks and corporations, it is difficult for an entrepreneurial firm to find out the identity of the group of institutional investors of the VC fund, and the percentage ownership of each institutional investor. As such, self selection (endogeneity) is unlikely to be problematic (e.g., who owns Kleiner Perkins in the US, and at what ownership percentage?). Nevertheless, as a robustness check, we excluded the wholly owned VC funds, and this did not affect the generality of our results (details are available upon request). As well, we also considered excluding second time funds in case institutional investors provided capital on the basis of first-fund efforts, and the results did not change (again, available upon request). As such, overall, we have no reason to believe there is a significant concern with endogeneity.

5.2 Governance: portfolio size

Table 4 indicates financial intermediation has a pronounced impact on span of control (portfolio size). Recall that our multivariate estimates of governance focus on the portfolio size per fund manager as different advices provided to investees, consistent with the theoretical work of Kanniainen and Keuschnigg (2003, 2004) (see also Keuschnigg and Nielsen, 2001, 2003a, b, c, 2004, for related theoretical work, and Cumming, 2004, for related empirical evidence). We focus our discussion on Model 1 in Table 4; the others are provided to show robustness. Note that the nonlinear specification is important (the linear Model 2 is rejected by the likelihood dominance criterion, among other model selection criterion, relative to all of the nonlinear models).

[Table 4 About Here]

Table 4 indicates that a fund that is 100% owned by an individual/manager will finance approximately 20 fewer companies per VC manager (a move from approximately the 75th percentile to the 25th percentile in the data), and thereby provide more advice and monitoring, compared to an average fund that does not comprise individual owner-managers. The data therefore indicate that all else equal, the delegation of governance to financial intermediaries, as opposed to governance by a non-intermediary that is an owner-manager, involves less governance. Put another way, owner-managers have personal vested interests in providing more governance to their investees relative to those financial intermediaries that do not have a direct financial stake with the direct investment of their own wealth.

Other forms of intermediation give rise to less governance than owner-manager VC funds. For example, an increase in bank ownership, corporate ownership and government ownership give rise to smaller portfolios per fund manager. However, the economic significance of those effects (the size of the coefficients and marginal effects reported in Table 4) is smaller relative to that for individual owner-managers. The effect of intermediation via other financial institutions has no statistically significant effect on portfolio size per manager.

The data indicate that US-affiliated fund have smaller portfolios per manager (1-2 fewer investee companies per VC fund manager, depending on the model specification in Table 4), which indicates US-affiliated VCs provide more governance provided to their investees. This likely indicates the importance

of focusing on generating a fewer number of more companies, in order to gain reputation in the foreign market thereby improving deal flow and networks with other domestic VCs.

Life insurance companies, by contrast, have much larger portfolio sizes per manager. One interpretation of this result is that life insurance companies are more risk adverse and seek diversification through larger portfolios. This is perhaps a more valuable strategy relative to diversifying across a greater number of venture funds given the costs to setting up a fund in terms of contracting and negotiating limited partnership agreements (as studied by Gompers and Lerner, 1996, 1999a).

The Herfindahl index of ownership concentration is positively associated with fund size. There are a few natural explanations for this result. First, ownership concentration is associated with an absence of diversification, and if there are costs associated with providing capital to a fund (as discussed immediately above) then there is value to diversification in terms of investment in a greater number of entrepreneurial firms. Second, captive fund managers tend to be less well compensated than those in funds set up as limited partnerships (Gompers and Lerner, 1999a), and therefore have less incentive (and perhaps fewer skills) to add value to a smaller number of investees per manager. As such, those funds finance less and advise more. Third, captive funds (for example) tend to invest with a dual purpose of maximizing the revenue for the fund itself as well as maximizing the revenue for the companion organization. Investing in a greater number of entrepreneurs may have side benefits of fostering relations with the companion organization that provided the capital to the VC fund. We may conjecture that this tendency to over-invest (from the viewpoint of the VC fund but not the institutional source of capital) would be mitigated by greater discipline brought by diversity in ownership.

The data indicate a positive association between portfolio size per manager and various other fund characteristics, including fund duration, funds raised, the number of prior funds raised by the VC organization, and the average experience of the fund managers. In regards to fund duration, this is expected due to the incidental truncation associated with not observing investments among funds that are not fully invested (i.e., a fund in our data may still invest in new companies in 2001 or 2002, etc). It is for this reason that we employed the heteroscedastic specification discussed above in section 5.1. In regards to funds raised, we observe greater portfolios per fund managers that have more capital, perhaps as expected if there are limits to the capital required by any given investee. The average experience of the fund managers is also positively related to the number of different investees, indicating efficiencies with skill acquisition in the process of VC investment (see Kannianen and Keuschnigg, 2004, for a supportive

theory). The estimates pertaining to the number of fund previously raised by the VC fund is also supportive of this latter prediction.⁹

Several of the control variables for stage and industry focus are significant. First, funds that focus more on deal origination (in respect of the variable for lead investor) tend to invest in fewer investees. This result is intuitive, as deal screening is much more time intensive for lead investments (Lerner, 1994). Second, note that seed, early and mezzanine focused funds have larger portfolios (relative to balanced stage funds, which is suppressed for reasons of collinearity as discussed above). Cumming (2004) finds similar evidence in respect of early stage investees, and interprets this as evidence of the benefits of specialization through stage focus. Buyout funds tend to have smaller portfolios, which might be attributable to the greater capital required for any given buyout transaction. There is also evidence that funds with a focus on the health, computers, semiconductors and biotech sectors have larger portfolios per manager, while energy focused funds have smaller portfolios. There are various possible explanations for these latter results; we have included those variables largely for control purposes. Finally, note that as with the fundraising evidence, there are diminishing returns to scale in respect of the concavity of the output function. The data indicate $\lambda < 1$, and significantly different from 0 and 1 (suggesting log and linear specifications are both inferior for the data).¹⁰

5.3 *Value adding behaviour: Scope of advice*

It is clear that banks and non-bank financial intermediaries improve liquidity in the area of monitored finance, as compared with specialist owner-manager VC funds. However, we have also found that ownership influences the level of governance provided the entrepreneurial firm. In this section we explore how value adding behaviour varies according to the different types of financial intermediaries operating in monitored finance.

The univariate analysis indicated that owner-manager VC funds provided a greater number of types of advice (on average) than other VC funds (Table 2 Panel A). This was especially the case for business brokering advice (Table 2 Panel B). By contrast, bank VC funds and corporate VC funds

⁹ However, an alternative interpretation of the number of funds previously raised by the VC organization is that there are inefficiencies associated with the process of fundraising, setting up a new fund and the allocation of attention to new investees. Gompers and Lerner (1996, 1999a) show institutional investors are quite concerned with this problem, and covenants that inhibit a VCs tendency to misallocate time

¹⁰ Supportive theory and consistent evidence of diminishing returns to scale in VC portfolio size expansion are provided by Kannianen and Keuschnigg (2003, 2004), Keuschnigg (2003a) and Cumming (2004). As discussed, our innovation to this literature on portfolio size is provided by showing the effect of financial (dis)intermediation, which not considered in these other papers.

provided less advice than other providers of monitored finance. These findings carry across to Model 1 in Table 5, which indicates owner-manager VC funds provide a greater scope of advice (our proxy for value adding behaviour). We also find that scope of advice is higher for funds with more fund managers and for VC funds that lead the investment. The relationship between fund managers and advice indicates that there are positive spillovers within the VC fund, with the greater the number of investment professionals leading to wider networks of contacts and ability to provide value to the portfolio company.

[Table 5 About Here]

The multivariate regressions reported in Table 5 indicate the US-affiliation dummy variable is positive but marginally insignificant when the other control variables for investment stages and industries, among other things, are included. Nevertheless, Table 2 Panel B indicated US-affiliated funds were more likely to provide technology and business broker advice. As well, Table 3 indicated a positive and significant (at the 5% level) correlation of 0.32 between the variable for the sum of advice measures and US affiliation (and the correlations for each of the specific advice measures are positive and significant in Table 3).

In Models 1 and 2 of Table 5, the data indicate lead investors are more likely to add value through advice given their primacy in the monitored finance relationship, presumably reflected in the level of capital extended to the entrepreneurial firm. Also, lead investors choose to lead an investment given their ex ante expectation of the marginal benefits of the investment. Thus, we would expect lead investors to add more value in order to maximize return and efficiently exploit their comparative advantages.

Models 2 and 3 in Table 5 show that the relationship between owner-manager VC funds and advice is not robust once we control for the stage of investment. The primary reason is that owner-manager funds are more focused on early stage (the correlation between these variables is 0.55; see Table 3). A priori, we expect seed and early stage entrepreneurial funds to require greater levels of advice given the need to help entrepreneurs establish the firm, validate technology, develop product and marketing strategies and generate revenue and profits (Gompers, 1995). By contrast, established firms receiving buyout or mezzanine finance would require less advice on issues such as technology and business brokering, or contacts through personal referrals. Both regressions show that early stage firms do require greater scope of advice, with positive coefficients conditional on industry, VC fund characteristics and ownership.

In short, the data do indicate owner manager VCs behave differently in that they offer a greater scope of advice to their portfolio companies relative to bank VCs and VCs of other institutional ownership. These differences, however, appear to be more directly related to the fact that individual owner manager VCs are focus on earlier stage investee companies.

6. Concluding Remarks

Franklin Allen's 2001 Presidential Address to the American Finance Association lamented the "narrowness" of asset pricing and corporate finance research in ignoring the role of financial intermediaries in the economy. A growing body of literature has attempted to address these earlier deficiencies by examining how modern financial intermediaries participate in finance markets. In this paper we contribute to the financial intermediation literature by considering the effect of intermediation on governance and value adding advice when monitored finance is provided to entrepreneurial firms. We examine a unique dataset enabling a direct comparison of owner-manager VC funds with different types of financial intermediation using data from 127 Japanese private equity funds. Our data enable a first empirical analysis of how different types of financial intermediaries behave when they extend their business operations into related markets such as venture capital financing, with direct comparison to owner-managers.

We present evidence in this paper in support of Allen's (2001, p. 1172) conjecture that the "role of financial institutions in ensuring good corporate governance is not entirely convincing". The theory of delegated monitoring suggests that financial intermediaries should have stronger incentives to oversee management behaviour in firms they finance. Our data shows that bank and non-bank financial intermediaries have larger portfolios than owner-manager VC funds, implying lower governance and oversight. Furthermore, we find significant differences between forms of affiliated intermediation, with life insurance company-affiliated VC funds having much larger portfolios per manager. By contrast, individual owner-manager funds tend to have much smaller portfolios per manager, focus on the earliest stage investee companies and provide a greater scope of advice. Given that owner manger funds invest in different types of ventures than affiliated VC funds, one cannot conclude that there are costs of financial intermediation associated to the lower level of governance.

A novel feature of our new dataset on financial intermediaries and monitored finance is that it enables a consideration of the impact of US institutional affiliations in Japanese VC funds. The data indicate material impacts on the process of financial intermediation in Japan from an association with US

investors, in terms of smaller portfolios per manager and more advice to entrepreneurial companies. The data indicate that the economic significance of US institutional affiliation within Japanese VC funds is in fact comparable in economic significance to financial disintermediation (owner-manager VC funds). US-affiliated funds in Japan are manage less entrepreneurial firms, ostensibly to become an established player in the market, and possibly due to a greater skill set in providing advice to facilitate the development of small entrepreneurial firms. This evidence suggests that further research on international differences in the form of financial intermediation along these lines might prove fruitful for understanding the comparative success of the US private equity market relative to that in other countries.

References

- Allen, F., 2001. Presidential address: Do financial institutions matter? *Journal of Finance* 56(4), 1165-1175.
- Allen, F. and Santomero, A. 2001. What do financial intermediaries do? *Journal of Banking and Finance* 25, 271-294.
- Allen, F., and Song, W-L., 2003. Venture capital and corporate governance. in *Corporate Governance and Capital Flows in a Global Economy* edited by Peter K. Cornelius and Bruce Kogut, Oxford University Press, forthcoming.
- Aoki, M. 1990. Toward an economic model of the Japanese firm. *Journal of Economic Literature* 28, 1-27.
- Bascha, A., and Walz, U. 2001a, Convertible Securities and Optimal Exit Decisions in Venture Capital Finance. *Journal of Corporate Finance* 7, 285-306.
- Bascha, A., and Walz, U. 2001b. Financing practices in the German venture capital industry: an empirical assessment, Working Paper, University of Tübingen.
- Bergemann, D., and Hege, U. 1998. Venture capital financing, moral hazard, and learning. *Journal of Banking and Finance* 22(6-8): 703-735.
- Berger, A., and Udell, G. 1998. The economics of small business finance: the roles of private equity and debt markets in the financial growth cycle. *Journal of Banking and Finance* 22(6-8): 613-673.
- Black, B. S., and Gilson, R.J. 1998. Venture capital and the structure of capital markets: banks versus stock markets. *Journal of Financial Economics* 47(3): 243-277.
- Brav, A. and Gompers, P., 1997, Myth or reality? The long-run underperformance of initial public offerings: Evidence from venture capital and nonventure capital-backed companies. *Journal of Finance* 52, 1791-1822.
- Casamatta, C., 2003. Financing and advising: optimal financial contracts with venture capitalists. *Journal of Finance* 58, 2059 – 2086.
- Casamatta, C. und C. Haritchabalet, 2003. Learning and syndication in venture capital investments. Working paper 3876. CEPR.
- Chan, Y-S; Siegel, D.R., and Thakor, A.V. 1990. Learning, corporate control and performance requirements in venture capital contracts. *International Economic Review* 31(2): 365-382.
- Cumming, D.J., 2004. The determinants of venture capital portfolio size: empirical evidence. *Journal of Business*, forthcoming.
- Denis, D., 2003. Entrepreneurial finance: an overview of the issues and evidence. *Journal of Corporate Finance*, forthcoming.
- Diamond, D., 1984. Financial intermediation and delegated monitoring. *Review of Economic Studies* 51, 393-414.

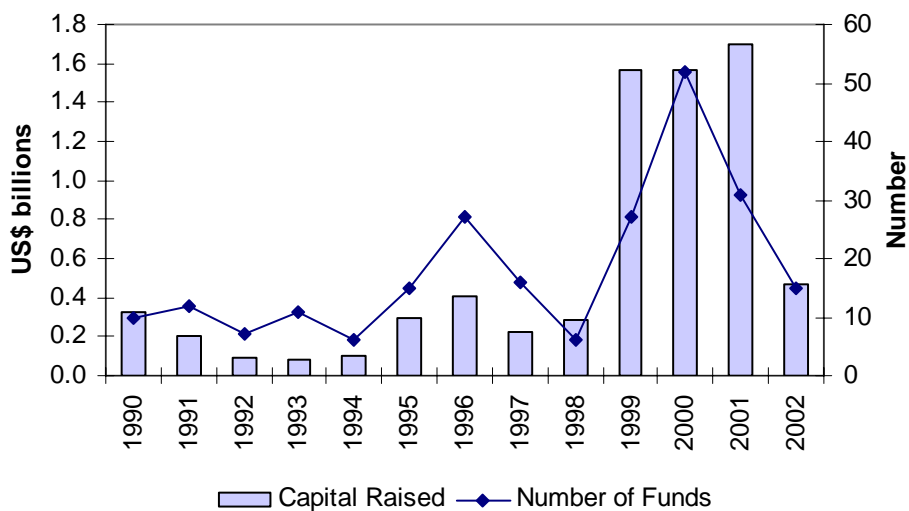
- Diamond, D., 1997. Liquidity, banks and markets. *Journal of Political Economy* 105, 928-956.
- Diamond, D., and Rajan, R. 2001. Banks and liquidity. *American Economic Review*, forthcoming.
- Fleming, G. 2004. Returns to venture capital in Australia. *Venture Capital: An International Journal of Entrepreneurial Finance* 6(1), 23-45.
- Gompers, P.A., 1995. Optimal investment, monitoring, and the staging of venture capital. *Journal of Finance* 50, 1461-1489.
- Gompers, P.A. 1998. Ownership and control in entrepreneurial firms: an examination of convertible securities in venture capital investments. Harvard University Working Paper.
- Gompers, P.A. and Lerner, J. 1996. The use of covenants: an empirical analysis of venture capital partnership agreements. *Journal of Law and Economics* 39, 463-498.
- Gompers, P.A., and Lerner, J. 1998. What drives venture fundraising? *Brookings Proceedings on Economic Activity - Microeconomics*, 149-192. National Bureau of Research Working Paper 6906 (January 1999).
- Gompers, P.A., and Lerner, J. 1999a. *The Venture Capital Cycle*. Cambridge: MIT Press.
- Gompers, P.A., and Lerner, J. 1999b. Conflict of interest in the issuance of public securities: evidence from venture capital. *Journal of Law and Economics* 42, 53-80.
- Gompers, P.A., and Lerner, J. 2000a. Money chasing deals?: The impact of fund inflows on the valuation of private equity investments. *Journal of Financial Economics*, 55, 281-325.
- Gompers, P.A., and Lerner, J. 2000b. The determinants of corporate venture capital success: organizational structure, incentives, and complementarities. in Randall Morck, editor, *Concentrated Ownership*, Chicago: University of Chicago Press for the National Bureau of Economic Research, pp. 17-50.
- Gompers, P.A. and Lerner, J. 2001a. The venture capital revolution, *Journal of Economic Perspectives* 15, 145-168.
- Gompers, P.A., and J. Lerner, 2001b. *The Money of Invention: How Venture Capital Creates New Wealth*. Boston: Harvard Business School Press.
- Gompers, P., Lerner, J. and Desai, M. 2003. The two faces of entrepreneurship: evidence from Eastern and Western Europe. Working Paper, Harvard Business School.
- Gompers, P.A., J. Lerner, and D. Scharfstein, 2004. Entrepreneurial spawning: public corporations and the formation of new ventures: 1986 – 1999. *Journal of Finance*, forthcoming.
- Gorton, G., and Winton, A. 2002. Financial intermediation, in the *Handbook of Economics and Finance*, edited by George Constantinides, Milton Harris and Rene Stulz (Amsterdam: North Holland).
- Greene, W.H., 1997. *Econometric Analysis*. New Jersey: Prentice Hall.

- Hamao, Y., Packer, F., and Ritter, J. 2000. Institutional affiliation and the role of venture capital: Evidence from initial public offerings in Japan. *Pacific-Basin Finance Journal* 8, 529-558.
- Hanazaki, M. and Horiuchi, A. 2000. Is Japan's financial system efficient? *Oxford Review of Economic Policy* 16, 61-73.
- Harris, L., 2003. *Trading & Exchanges: Market Microstructure for Practitioners*. Oxford University Press.
- Hege, U., F. Palomino and A. Schwienbacher 2003. Determinants of venture capital performance: Europe and the United States. Working Paper, HEC School of Management and the University of Amsterdam.
- Hoshi, T., Kashyap, A. and Scharfstein, D. 1991. Corporate structure, liquidity and investment: Evidence from Japanese industrial groups. *Quarterly Journal of Economics* 106, 33-60.
- Jeng, L.A., and Wells, P.C. 2000. The determinants of venture capital fundraising: evidence across countries. *Journal of Corporate Finance* 6, 241-89.
- John, K., John, T. and Saunders, A. 1994. Universal banking and firm risk-taking. *Journal of Banking and Finance* 18, 307-323.
- Kanniainen, V, and Keuschnigg, C. 2003. The optimal portfolio of start-up firms in venture capital finance. *Journal of Corporate Finance* 9, 521-534.
- Kanniainen, V., and Keuschnigg, C. 2004. Start-up investment with scarce venture capital support. *Journal of Banking and Finance* 28, 1935 – 1959.
- Keuschnigg, C., 2002. Venture capital backed growth. *Journal of Economic Growth* 9, 239 – 261.
- Keuschnigg, C., 2003a. Taxation of a venture capitalist with a portfolio of firms. *Oxford Economic Papers* 56, 285 – 306.
- Keuschnigg, C., 2003b. Public policy and venture capital backed innovation. Working Paper No. 2003-09, University of St. Gallen.
- Keuschnigg, C., and Nielsen, S.B. 2001. Public policy for venture capital. *International Tax and Public Finance* 8, 557-572.
- Keuschnigg, C., and Nielsen, S.B. 2003a. Tax policy, venture capital and entrepreneurship. *Journal of Public Economics* 87, 175-203.
- Keuschnigg, C., and Nielsen, S.B. 2003b. Taxes and venture capital support. *Review of Finance* 7, 515 – 539.
- Keuschnigg, C., and Nielsen, S.B. 2004a. Progressive taxation, moral hazard, and entrepreneurship. *Journal of Public Economic Theory* 6, 471 – 490.
- Keuschnigg, C., and Nielsen, S.B. 2004b. Start-ups, venture capitalists, and the capital gains tax. *Journal of Public Economics* 88, 1011-1042.
- Kirilenko, A.A. 2001. Valuation and control in venture finance. *Journal of Finance* 56(2), 565-587.

- Kyle, A., 1985. Continuous auctions and insider trading. *Econometrica* 53, 1315-1335.
- Kortum, S., and Lerner, J. 2000. Assessing the contribution of venture capital to innovation. *RAND Journal of Economics* 31, 647-692.
- Kuroki, M., Rice, M. and Abetti, P. 2000. Emerging trends in the Japanese venture capital industry. *Journal of Private Equity* Winter, 39-49.
- Landier, A., 2001. Start-up financing: from banks to venture capital. Working paper, University of Chicago Graduate School of Business.
- Leland, H.E., and D.H. Pyle, 1977. Information asymmetries, financial structure and financial intermediation. *Journal of Finance* 32, 371-387.
- Lerner, J. 1994. The syndication of venture capital investments. *Financial Management* 23, 16-27.
- Lerner, J., 1995. Venture capitalists and the oversight of private firms. *Journal of Finance* 50, 301-318.
- Lerner, J. 1999. The government as a venture capitalist: the long-run effects of the SBIR program. *Journal of Business* 72, 285-318.
- Lerner, J., 2000. *Venture Capital and Private Equity: A Casebook*. New York: Wiley.
- Lerner, J., 2002a. Boom and bust in the venture capital industry and the impact on innovation. *Federal Reserve Bank of Atlanta Economic Review* 2002(4), 25-39.
- Lerner, J., 2002b. When bureaucrats meet entrepreneurs: the design of effective 'public venture capital' programmes. *Economic Journal* 112, F73-F84.
- Lerner, J. and Schoar, A. 2002. The illiquidity puzzle: theory and evidence from private equity. *Journal of Financial Economics*, forthcoming.
- Lerner, J., and Schoar, A. 2003. Private equity in the developing world: the determinants of transaction structure. Working Paper, Harvard Business School and Massachusetts Institute of Technology.
- Lerner, J., Schoar, A., and Wong, W. 2004. Smart institutions, foolish choices? The limited partner performance puzzle. Working Paper, Harvard Business School and Massachusetts Institute of Technology.
- Li, X., and R. Masulis, 2004. Venture capital investments by IPO underwriters: certification, alignment of interest or moral hazard? Working Paper, Owen Graduate School of Management.
- Lichtenberg, F. and Pushner, G. 1994. Ownership structure and corporate performance in Japan. *Japan and the World Economy* 6, 239-261.
- Mayer, C., K. Schoors, and Yafeh, Y. 2004. Sources of funds and investment strategies of VC funds: evidence from Germany, Israel, Japan and the UK. *Journal of Corporate Finance*, forthcoming.
- Ministry of Economy, Trade and Industry. 2001. Annual Survey of Japanese Venture Capital Investments 2000. Venture Enterprise Center.

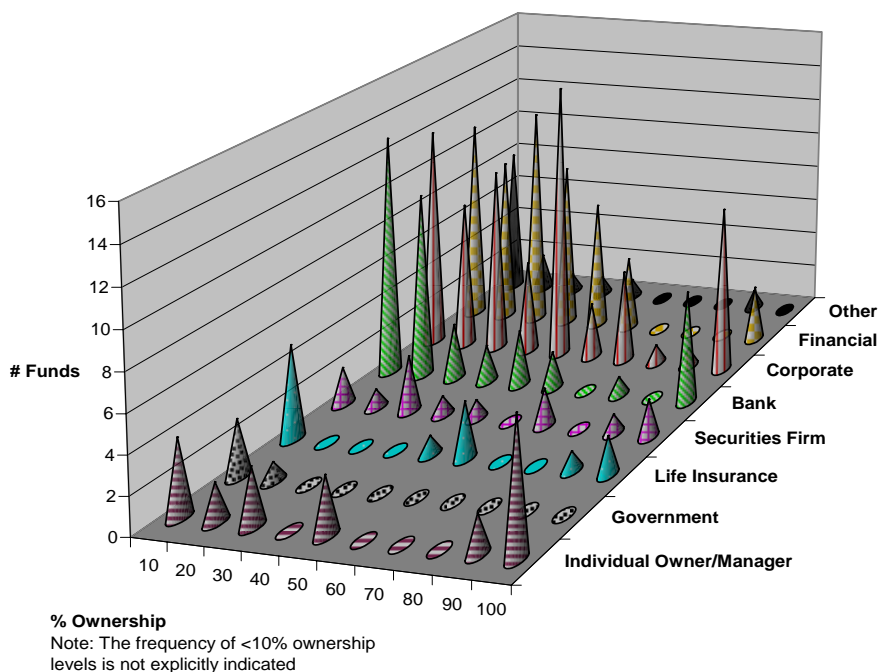
- Morck, R. and Nakamura, M. 1999. Banks and corporate control in Japan. *Journal of Finance* 54, 319-339.
- Morck, R., A. Shleifer and Vishny, R. 1988. Management ownership and corporate performance: an empirical analysis. *Journal of Financial Economics* 20, 293-315.
- Neus, W., and Walz, U. 2002. Exit timing of venture capitalists in the course of an initial public offering. *Journal of Financial Intermediation*, forthcoming.
- Norton, E. and Tenenbaum, B., 1993. Specialization versus diversification as a venture capital investment strategy. *Journal of Business Venturing* 8, 431-442.
- Prowse, S. 1990. Institutional investment patterns and corporate financial behavior in the United States and Japan. *Journal of Financial Economics* 27, 43-66.
- Sahlman, W.A. 1990. The structure and governance of venture capital organizations. *Journal of Financial Economics* 27(2), 473-521.
- Schwienbacher, A. 2003. Innovation and venture capital exits, Working paper, University of Amsterdam.
- Sheard, P. 1989. The main bank system of corporate monitoring and control in Japan. *Journal of Economic Behavior and Organisation* 11, 399-422.
- Shin, G. and Kolari, J. 2004. Do some lenders have information advantages? Evidence from Japanese credit market data. *Journal of Banking and Finance*, forthcoming.
- Stiglitz, J. 1985. Credit Markets and Control of Capital. *Journal of Money, Credit and Banking*.
- Tirole, J., 1998. *The Theory of Industrial Organization*. Cambridge: MIT Press.
- Trester, J.J., 1998. Venture capital contracting under asymmetric information. *Journal of Banking and Finance* 22(6-8), 675-699.
- Ueda, M. 2004. Banks versus venture capital: project evaluation, screening, and expropriation. *Journal of Finance* 54, 601-621.
- Weinstein, D. and Yafeh, Y. 1998. On the costs of a bank-centered financial system: Evidence from the changing main bank relations in Japan. *Journal of Finance* 53, 635-672.
- Williamson, S., 1986. Costly monitoring, financial intermediation, and equilibrium credit rationing. *Journal of Monetary Economics* 18, 159-179.
- Yoshikawa, Y., Phan, P. and Linton, L. 2004. The relationship between governance structure and risk management approaches in Japanese venture capital firms. *Journal of Business Venturing*, forthcoming.

Figure 1. Japanese Private Equity Capital Raisings and Number of Funds, 1990-2002



Source: Venture Economics

Figure 2. Ownership % of Japanese Venture Funds in 2000



Source: VEC Survey, Japan

Table 1: Variable Definitions

<i>Dependent Variables</i>	
Portfolio Size / VC Manager	The number of entrepreneurial firms in which the fund invested divided by the number of fund managers.
Personal Referral	A dummy variable equal one if the fund provides advice to entrepreneurs in the form of personal referral (setting up links with other business partners).
Management Consulting	A dummy variable equal one if the fund provides advice to entrepreneurs in the form of management consulting (financial and strategic advice).
Client Intermediary	A dummy variable equal one if the fund provides advice to entrepreneurs in the form of client intermediation (finding clients for the firm).
Technology Broker	A dummy variable equal one if the fund provides advice to entrepreneurs in the form of technology brokering (setting up links for technological advancement).
Business Broker	A dummy variable equal one if the fund provides advice to entrepreneurs in the form of business brokering (facilitating the sale of the firm).
Sum of Advice Measures	The sum of the 5 advice measures (personal referral, management consulting, client intermediary, technology broker, and business broker).
<i>Ownership Variables</i>	
Individual (owner-manager)	The ownership percentage of the individual fund managers that carry out the operations of the fund (top 5 individual ownership % only).
Life Insurance	The ownership percentage of life insurance companies in the fund (top 5 life insurance ownership % only).
Bank	The ownership percentage of banks in the fund (top 5 bank ownership % only).
Corporate	The ownership percentage of corporations in the fund (top 5 corporate ownership % only).
Securities Firm	The ownership percentage of securities companies in the fund (top 5 securities firm ownership % only).
Other Financial Institution	The ownership percentage of other financial institutions in the fund (top 5 other financial institutions ownership % only).
Government	The ownership percentage of the government in the fund (top 5 other government ownership % only).
Herfindahl Index	The sum of squares of the ownership percentages of the top 5 owners in the VC fund.
<i>Fund Characteristics</i>	
US Affiliation	A dummy variable equal to one for Japanese VC funds with a US institutional investor.
Funds Raised	The amount of capital raised by the venture capital fund in millions of 2000 Yen.
Fund Age	The age of the fund in years up to the period 2000.
Number of Funds	The number of funds raised by the private equity firm.
Average Experience of VC Managers	The total number of years of experience of the managers divided by the number of managers.
Proportion of Investments Exited	The proportion of investments exited (either by IPO, acquisition and/or write-off).
Lead Investments	The percentage of investments taken as the lead investor.

Table 1 (Continued)

<i>Stage Controls</i>	
Seed Stage	The percentage of investments at the seed stage. Seed Stage financing is provided for research, and to assess and develop an initial concept; seed stage companies may be in the process of being set up or may have been in business for a short time, but have not sold their product commercially.
Early Stage	The percentage of investments at the early stage. Early Stage financing is provided for the growth of a company, which may or may not break even or trade profitably. Capital may be used to: finance increased production capacity; market or product development; provide additional working capital.
Mezzanine Stage	The percentage of investments at the mezzanine stage, whereby the company has reached profitable operating levels.
Buyout Stage	The percentage of investments at the buyout stage, for the acquisition of another company.
<i>Industry Controls</i>	
Health	Percentage of the fund's focus in the health sector.
Computers	Percentage of the fund's focus in the computer sector.
Semiconductors	Percentage of the fund's focus in the semiconductor sector.
Biotechnology	Percentage of the fund's focus in the biotechnology sector.
Energy	Percentage of the fund's focus in the energy sector.
Retail	Percentage of the fund's focus in the retail sector.
<i>Returns to Scale</i>	
λ	The degree of curvature of the output function, based on the Box-Cox transformation ($\lambda < 1$ implies concavity; $\lambda = 0$ implies logarithmic; $\lambda = 1$ implies linear; $\lambda > 1$ implies convexity).

Table 2 – Panel A. Summary Statistics and Univariate Results

	Characteristic	# Funds	Average Fund Capital/ VC Manager	T-Test (means)	Median Fund Capital / VC Manager	Z-Test (medians)	Average Portfolio Size / VC Manager	T-Test (means)	Median Portfolio Size / VC Manager	Z-Test (medians)	Average # Types of Advice	T-Test (means)	Median # Types of Advice	Z-Test (medians)
1	All Funds	127	39.325		16.667		7.500		4.250		2.559		3.000	
2	Individual Ownership > 10%	21	25.434	-1.356	9.286	p <= 0.788	2.104	-5.904***	1.528	p <= 0.000***	3.190	1.746*	3.000	p <= 0.184
	Individual Ownership < 10%	106	41.838		16.667		8.502		6.000		2.434		3.000	
3	Bank Ownership > 10 %	40	57.360	1.177	18.333	p <= 0.858	9.110	1.505	6.750	p <= 0.092*	2.125	-1.965**	2.000	p <= 0.109
	Bank Ownership < 10 %	87	30.737		16.667		6.642		3.648		2.759		3.000	
4	Corporate Ownership > 10%	69	25.696	-1.790*	16.667	p <= 0.401	6.409	-1.449	4.000	p <= 0.919	2.101	-3.384***	2.000	p <= 0.018**
	Corporate Ownership < 10%	58	56.422		22.727		8.822		4.717		3.103		3.000	
5	Life Insurance Ownership > 10 %	12	39.202	-0.006	15.833	p <= 0.807	15.409	1.764*	8.893	p <= 0.218	3.000	1.329	3.000	p <= 0.301
	Life Insurance Ownership < 10 %	115	39.338		16.667		6.664		3.931		2.513		3.000	
6	Securities Firm Ownership > 10 %	13	35.267	-0.410	26.667	p <= 0.176	7.152	-0.216	7.391	p <= 0.379	2.538	-0.047	3.000	p <= 0.609
	Securities Firm Ownership < 10 %	114	39.800		16.667		7.541		4.000		2.561		3.000	
7	Other Financial Ownership > 10%	55	39.308	-0.002	16.667	p <= 0.092*	6.787	-0.819	4.500	p <= 0.502	2.218	-1.967**	2.000	p <= 0.185
	Other Financial Ownership < 10%	72	39.338		25.000		8.030		3.212		2.819		3.000	
8	Government Ownership > 10 %	4	72.793	1.503	78.351	p <= 0.545	9.748	0.599	8.101	p <= 0.625	3.250	0.931	3.000	p <= 0.433
	Government Ownership < 10 %	123	38.209		16.667		7.419		4.000		2.537		3.000	
9	Other Ownership > 10%	14	20.291	-2.236**	15.000	p <= 0.927	7.771	0.118	4.500	p <= 0.58	2.714	0.382	3.000	p <= 0.748
	Other Ownership < 10%	113	41.747		16.667		7.466		4.000		2.540		3.000	
10	US Affiliation	12	37.889	-0.105	32.333	p <= 0.425	3.973	-2.905***	3.276	p <= 0.309	3.750	2.774***	4.000	p <= 0.100*
	No US Affiliation	115	39.465		16.667		7.836		4.500		2.435		3.000	

Table 2 – Panel B. Summary Statistics and Univariate Results

	Characteristic	# Funds	Proportion of Funds Providing Personal Referral Advice	T-Test	Proportion of Funds Providing Management Consulting Advice	T-Test	Proportion of Funds Providing Client Intermediary Advice	T-Test	Proportion of Funds Providing Technology Broker Advice	T-Test	Proportion of Funds Providing Business Broker Advice	T-Test
1	All Funds	127	0.509		0.620		0.593		0.241		0.426	
2	Individual Ownership > 10%	21	0.667	1.238	0.762	1.087	0.714	0.925	0.333	0.737	0.714	2.351**
	Individual Ownership < 10%	106	0.519		0.632		0.604		0.245		0.434	
3	Bank Ownership > 10 %	40	0.525	-0.280	0.550	-1.583	0.575	-0.719	0.150	-1.691*	0.325	-2.379**
	Bank Ownership < 10 %	87	0.552		0.701		0.644		0.310		0.552	
4	Corporate Ownership > 10%	69	0.449	-2.313**	0.565	-2.172**	0.507	-2.824***	0.203	-1.402	0.377	-2.548**
	Corporate Ownership < 10%	58	0.655		0.759		0.759		0.328		0.603	
5	Life Insurance Ownership > 10 %	12	0.583	0.291	0.750	0.702	0.917	2.147**	0.250	-0.072	0.500	0.143
	Life Insurance Ownership < 10 %	115	0.539		0.643		0.591		0.261		0.478	
6	Securities Firm Ownership > 10 %	13	0.692	1.134	0.615	-0.290	0.538	-0.636	0.231	-0.221	0.462	-0.143
	Securities Firm Ownership < 10 %	114	0.526		0.658		0.632		0.263		0.482	
7	Other Financial Ownership > 10%	55	0.455	-1.749*	0.655	0.020	0.564	-1.151	0.182	-1.541	0.364	-2.301**
	Other Financial Ownership < 10%	72	0.611		0.653		0.667		0.319		0.569	
8	Government Ownership > 10 %	4	0.750	0.840	1.000	1.410	0.750	0.520	0.500	0.982	0.250	-0.941
	Government Ownership < 10 %	123	0.537		0.642		0.618		0.252		0.488	
9	Other Ownership > 10%	14	0.643	0.790	0.857	1.616	0.571	-0.402	0.214	-0.361	0.429	-0.411
	Other Ownership < 10%	113	0.531		0.628		0.628		0.265		0.487	
10	US Affiliation	12	0.667	0.898	0.833	1.309	0.833	1.539	0.500	1.764*	0.917	3.203***
	No US Affiliation	115	0.530		0.635		0.600		0.235		0.435	

Table 3. Correlation Matrix

This table presents correlation coefficients across selected variables in the dataset. Correlations greater than 0.17 in absolute value are statistically significant at the 5% level and highlighted in underline.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1 Fund Capital	1.00																				
2 Portfolio Size / Fund Managers	-0.03	1.00																			
3 Individual Ownership	<u>0.21</u>	<u>-0.21</u>	1.00																		
4 Life Insurance Ownership	-0.02	0.07	-0.09	1.00																	
5 Bank Ownership	-0.07	<u>0.22</u>	-0.17	-0.15	1.00																
6 Corporate Ownership	-0.15	<u>-0.20</u>	<u>-0.21</u>	<u>-0.20</u>	<u>-0.32</u>	1.00															
7 Securities Firm Ownership	0.06	0.06	-0.09	-0.07	-0.16	-0.15	1.00														
8 Other Financial Institution Ownership	-0.16	0.00	-0.20	-0.09	<u>-0.19</u>	-0.11	-0.14	1.00													
9 Government Ownership	0.14	<u>0.17</u>	-0.05	-0.05	-0.01	-0.12	-0.05	-0.12	1.00												
10 Herfindahl Index	-0.05	0.01	<u>0.19</u>	<u>0.17</u>	<u>0.28</u>	<u>0.19</u>	<u>0.19</u>	<u>-0.22</u>	<u>-0.21</u>	1.00											
11 US Affiliation	<u>0.55</u>	-0.10	<u>0.35</u>	0.04	-0.17	<u>-0.21</u>	-0.06	-0.05	0.15	0.00	1.00										
12 Firm Age	<u>0.34</u>	<u>0.25</u>	-0.15	-0.13	0.05	-0.05	<u>-0.20</u>	<u>0.44</u>	0.08	<u>-0.19</u>	0.06	1.00									
13 Number of Funds	<u>0.80</u>	-0.07	<u>0.19</u>	0.01	-0.12	<u>-0.18</u>	-0.11	-0.06	<u>0.32</u>	0.08	<u>0.74</u>	<u>0.19</u>	1.00								
14 Average Experience of VC Managers	-0.01	<u>0.24</u>	0.04	0.08	-0.02	-0.03	<u>-0.22</u>	<u>0.31</u>	0.03	-0.06	-0.03	0.12	-0.10	1.00							
15 Lead Investments	0.12	0.04	-0.04	-0.02	0.00	-0.07	-0.06	<u>0.57</u>	-0.06	-0.14	0.00	<u>0.30</u>	-0.04	0.14	1.00						
16 Seed Stage	-0.05	-0.03	<u>0.55</u>	-0.13	-0.13	0.08	-0.05	-0.09	-0.10	<u>0.28</u>	-0.07	<u>-0.27</u>	-0.02	0.07	-0.05	1.00					
17 Sum of Advice Measures	<u>0.26</u>	0.07	<u>0.20</u>	0.11	<u>-0.26</u>	-0.06	-0.04	0.17	0.08	0.10	<u>0.32</u>	0.11	<u>0.33</u>	0.01	<u>0.20</u>	<u>0.18</u>	1.00				
18 Personal Referral	<u>0.25</u>	0.09	0.10	0.08	-0.10	-0.02	-0.16	0.14	<u>0.18</u>	0.16	<u>0.26</u>	0.12	<u>0.28</u>	0.04	0.14	0.11	<u>0.72</u>	1.00			
19 Management Consulting	0.15	-0.07	<u>0.17</u>	0.07	<u>-0.24</u>	-0.06	0.08	0.11	0.00	0.03	<u>0.20</u>	-0.07	0.16	-0.03	0.11	0.10	<u>0.71</u>	<u>0.36</u>	1.00		
20 Client Intermediary	0.15	0.10	0.13	<u>0.20</u>	-0.14	-0.07	-0.01	0.12	-0.01	0.14	<u>0.21</u>	0.03	<u>0.21</u>	0.08	0.10	<u>0.21</u>	<u>0.73</u>	<u>0.39</u>	<u>0.42</u>	1.00	
21 Technology Broker	<u>0.18</u>	0.06	0.06	-0.12	<u>-0.20</u>	0.06	-0.06	<u>0.29</u>	0.09	-0.10	<u>0.19</u>	<u>0.30</u>	<u>0.24</u>	0.04	<u>0.22</u>	0.00	<u>0.63</u>	<u>0.37</u>	<u>0.19</u>	<u>0.40</u>	1.00
22 Business Broker	<u>0.23</u>	0.05	<u>0.24</u>	0.15	<u>-0.26</u>	-0.09	0.02	-0.02	0.03	0.10	<u>0.30</u>	0.05	<u>0.30</u>	-0.10	0.16	<u>0.20</u>	<u>0.80</u>	<u>0.46</u>	<u>0.57</u>	<u>0.44</u>	<u>0.39</u>

Table 4. Analysis of Portfolio Size/Fund Manager

This table presents OLS and Box-Cox regressions of the determinants of VC portfolio size. The dependent variable is the number of entrepreneurial firms in the VC fund's portfolio / the number of VC fund managers. The independent variables are as defined in Table 1. Box-Cox specification: $B(x,\lambda)=(x^\lambda-1)/\lambda$ when λ not equal to 0; $\log(x)$ when $\lambda=0$; x =independent variables. Grid searches for λ from -2 to +2 to maximize the loglikelihood. Heteroscedastic specification: $Var(\epsilon)=(\sigma^2)[w^2]^{(\lambda)}$, where w =fund duration. The marginal effects are computed ignoring the residuals. Various assumptions about the distribution of the residuals did not materially affect the marginal effects, as the high R^2 values indicate relatively small residuals. Fourteen observations were lost due to missing data for certain variables. ***, **, * Significant at the 1%, 5% and 10% levels, respectively. Two-sided tests. "---" = Not Applicable, or variable excluded for robustness checks.

Independent Variables	1. Box-Cox				2. Linear		3. Box-Cox		4. Box-Cox		5. Box-Cox	
	Coefficient	t-statistic	Slope	Elasticity	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	-11.360	-	-	-0.999	-18.535	-1.910*	-10.382	-	-0.626	-0.856	-11.920	-3.410***
<i>Ownership Variables</i>												
Individual	-0.766	-	-0.204	-0.124	-0.016	-0.285	-0.950	-8.206***	-0.277	-5.747***	-4.109	-4.059***
Life Insurance	1.034	13.971***	0.286	0.165	0.211	2.305**	1.450	8.836***	1.596	10.027***	---	---
Bank	-0.159	-4.897***	-0.021	-0.035	0.076	1.468	---	---	---	---	-1.137	-2.570**
Corporate	-0.547	-	-0.057	-0.136	-0.029	-0.656	-0.639	-7.922***	---	---	-2.447	-3.836***
Securities Firm	-0.636	-	-0.149	-0.110	0.025	0.504	-0.592	-7.052***	---	---	---	---
Other Financial Institution	0.016	0.790	0.003	0.004	0.040	0.892	---	---	---	---	---	---
Government	-0.330	-4.146***	-0.157	-0.041	0.358	1.960**	-0.329	-2.562**	-0.001	-0.013	---	---
Herfindahl Index	0.118	5.356***	0.0004	0.145	0.0003	0.653	---	---	---	---	---	---
US Affiliation	-1.216	-3.759***	-1.216	-0.008	-3.321	-0.886	-0.799	-2.542**	-2.101	-5.248***	---	---
<i>Fund Characteristics</i>												
VC Fund Duration	2.170	14.123***	0.2915	0.4827	0.1857	1.964**	2.286	8.642***	2.145	9.783***	6.960	3.579***
VC Funds Raised (million Yen)	0.116	5.606***	0.008	0.035	-0.004	-0.724	0.257	4.666***	0.115	3.925***	2.581	2.679***
Number of Funds	0.237	3.468***	0.066	0.038	0.026	0.308	---	---	0.639	6.184***	-0.677	-0.877
Average Experience of VC Managers	1.482	14.801***	0.479	0.220	0.343	2.687***	2.032	9.813***	1.773	10.654***	5.257	4.283***
Lead Investments	-0.078	-5.069***	-0.006	-0.022	-0.007	-	-0.043	-1.251	---	---	---	---
<i>Stage Controls</i>												
Seed Stage	0.164	4.879***	0.039	0.028	0.009	0.178	0.504	7.377***	---	---	2.138	3.909***
Early Stage	0.201	8.847***	0.022	0.050	0.075	2.538**	---	---	---	---	---	---
Mezzanine Stage	0.663	11.421***	0.244	0.093	0.194	1.456	---	---	---	---	---	---
Buyout Stage	-0.924	-	-0.288	-0.139	-0.127	-1.551	---	---	-0.879	-	---	---
<i>Industry Controls</i>												
Health	4.444	25.362***	2.467	0.513	2.005	2.283**	4.575	14.848***	---	---	---	---
Computers	1.374	14.652***	0.637	0.172	1.201	2.622***	2.379	12.535***	---	---	2.058	2.569**
Semiconductors	0.498	2.617***	0.275	0.058	2.083	1.562	---	---	1.061	4.259***	---	---
Biotechnology	2.918	19.531***	1.515	0.347	2.572	2.570**	3.566	13.590***	---	---	4.398	3.648***
Energy	-2.162	-9.855***	-1.285	-0.242	-1.415	-2.123**	---	---	-4.022	-	---	---
Retail	0.040	0.227	0.023	0.005	0.295	0.257	---	---	---	---	---	---
<i>Returns to Scale</i>												
λ	0.316	11.743***	---	---	---	---	0.197	4.616***	0.264	6.944***	-0.244	-2.167**
# Observations	113				113		113		113		113	
Adjusted R ²	0.960				0.300		0.934		0.939		0.787	
F-Statistic	88.05***				3.00***		98.81***		140.14***		37.37***	
Loglikelihood	-225.098				-386.264		-253.554		-249.422		-319.992	
Akaike Information Statistic	4.427				7.279		4.753		4.627		5.858	

Table 5. Analysis of Scope of Advice

This table presents ordered logit regressions of the determinants of the scope of VC advice. The dependent variable is the number of different types of advice provided by the VC fund to the entrepreneurial firm (among the 5 commonly advertised types of advice advertised in Japan: Personal Referral, Management Consulting, Client Intermediary, Technology Broker, Business Broker). One observation was lost due to missing data for a variable in Models 1 and 2, and 3 observations were lost in Model 3. The independent variables are as defined in Table 1. ***, **, * Significant at the 1%, 5% and 10% levels, respectively. Two-sided tests. "---" = Not Applicable, or variable excluded for robustness checks.

Independent Variables	1. Ordered Logit									2. Ordered Logit		3. Ordered Logit	
	Coefficient	t-statistic	Marginal Effect Advice=0	Marginal Effect Advice=1	Marginal Effect Advice=2	Marginal Effect Advice=3	Marginal Effect Advice=4	Marginal Effect Advice=5	Coefficient	t-statistic	Coefficient	t-statistic	
Constant	-0.120	-0.099	0.025	0.013	0.007	0.000	-0.018	-0.027	-0.805	-0.563	-0.809	-0.530	
<i>Ownership Variables</i>													
Individual	0.010	2.176**	-0.002	-0.001	-0.001	0.000	0.002	0.002	0.007	1.294	0.010	1.447	
Life Insurance	0.006	0.515	-0.001	-0.001	0.000	0.000	0.001	0.001	0.007	0.604	0.006	0.497	
Bank	-0.008	-1.270	0.002	0.001	0.001	0.000	-0.001	-0.002	-0.004	-0.686	-0.006	-0.874	
Corporate	-0.005	-1.284	0.001	0.001	0.000	0.000	-0.001	-0.001	-0.005	-0.996	-0.004	-0.773	
Securities Firm	-0.004	-0.778	0.001	0.000	0.000	0.000	-0.001	-0.001	-0.002	-0.354	-0.002	-0.387	
Other Financial Institution	0.016	0.115	-0.003	-0.002	-0.001	0.000	0.002	0.004	0.026	0.468	0.025	0.470	
Government	0.002	0.326	0.000	0.000	0.000	0.000	0.000	0.001	0.007	0.957	0.003	0.293	
US Affiliation	---	---	---	---	---	---	---	---	0.716	1.592	0.616	1.303	
<i>Fund Characteristics</i>													
Number of Fund Managers	0.005	1.928*	-0.001	-0.001	0.000	0.000	0.001	0.001	0.003	1.375	-0.006	-0.820	
VC Fund Duration	---	---	---	---	---	---	---	---	---	---	0.004	0.312	
VC Funds Raised (million Yen)	---	---	---	---	---	---	---	---	---	---	0.001	0.554	
Number of Funds	---	---	---	---	---	---	---	---	---	---	0.063	1.372	
Average Experience of VC Managers	0.014	0.523	-0.003	-0.002	-0.001	0.000	0.002	0.003	0.004	0.150	0.001	0.030	
Lead Investments	0.016	2.266**	-0.003	-0.002	-0.001	0.000	0.002	0.004	0.012	1.876*	0.013	1.990	
<i>Stage Controls</i>													
Seed Stage	---	---	---	---	---	---	---	---	0.012	1.375	0.011	1.258	
Early Stage	---	---	---	---	---	---	---	---	0.014	2.713***	0.013	2.234**	
Mezzanine Stage	---	---	---	---	---	---	---	---	-0.002	-0.198	-0.003	-0.223	
Buyout Stage	---	---	---	---	---	---	---	---	0.006	0.395	0.003	0.186	
<i>Industry Controls</i>													
Health	0.000	-0.003	0.000	0.000	0.000	0.000	0.000	0.000	-0.065	-0.431	-0.070	-0.452	
Computers	0.055	0.693	-0.011	-0.006	-0.003	0.000	0.008	0.012	0.052	0.605	0.037	0.423	
Semiconductors	0.297	1.878*	-0.062	-0.032	-0.018	-0.001	0.045	0.068	0.373	2.042**	0.357	1.874*	
Biotechnology	-0.001	-0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.036	0.000	-0.002	
Energy	-0.029	-0.143	0.006	0.003	0.002	0.000	-0.004	-0.007	0.011	0.047	0.010	0.043	
Retail	0.077	0.467	-0.016	-0.008	-0.005	0.000	0.012	0.018	0.059	0.278	0.057	0.249	
μ_1	0.452	4.013**	---	---	---	---	---	---	0.503	3.843***	0.506	3.822***	
μ_2	0.784	5.730***	---	---	---	---	---	---	0.861	5.625***	0.869	5.593***	
μ_3	1.463	8.162***	---	---	---	---	---	---	1.578	7.890***	1.591	7.684***	
μ_4	2.196	9.783***	---	---	---	---	---	---	2.353	9.282***	2.397	9.264***	
# Observations	126									126		124	
Chi-Squared	38.026***									54.216***		59.943***	
Loglikelihood	-203.246									-195.151		-189.058	